

ANNOTATED BIBLIOGRAPHY FOR:
CONNECTICUT RIVER
STREAMBANK EROSION STUDY
MASSACHUSETTS, NEW HAMPSHIRE AND VERMONT

DEPARTMENT OF THE ARMY
NEW ENGLAND ENGINEER CENTER
WALTHAM, MASS.

November 1973

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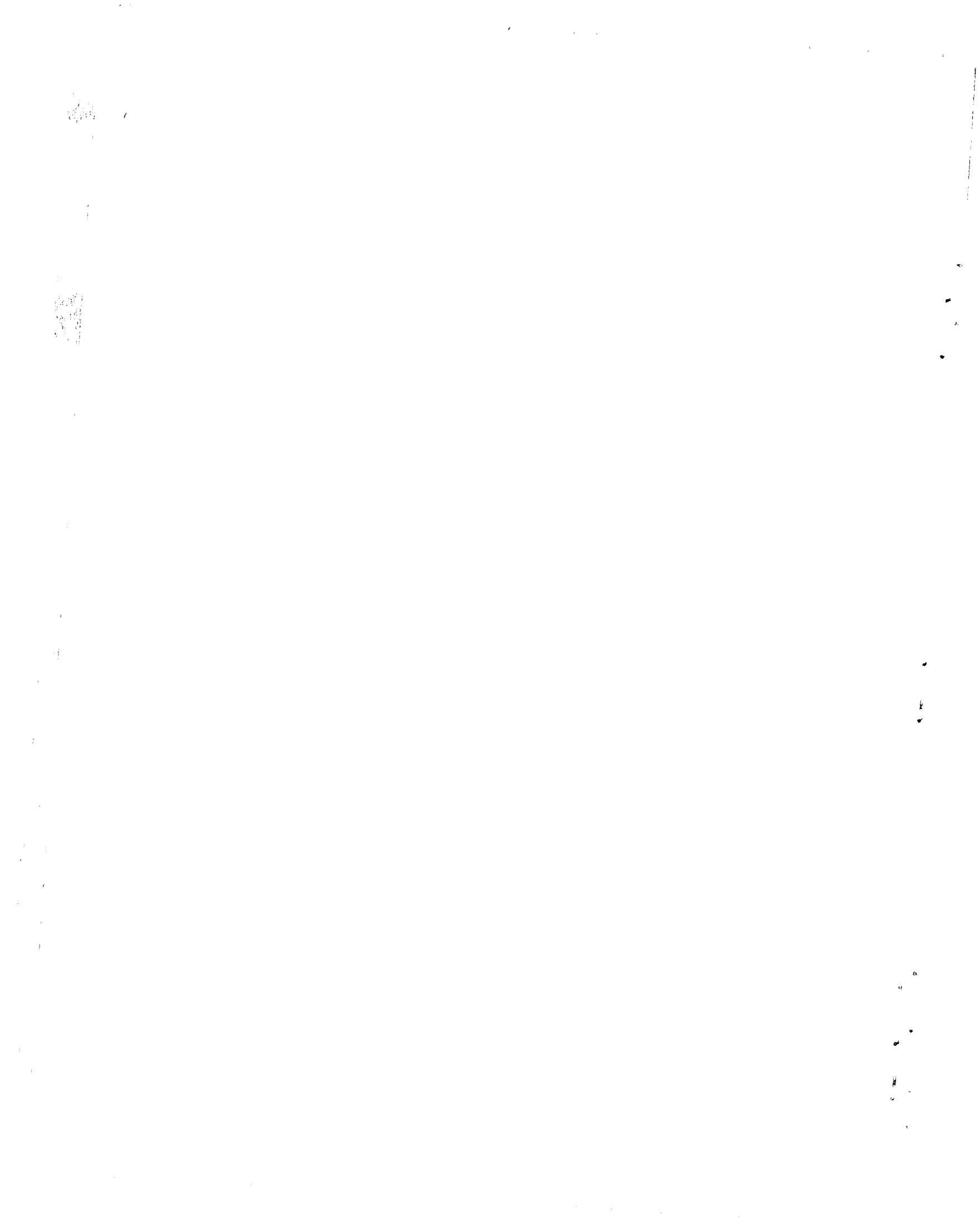
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A. S T R E A M

- 1A. DAY, J. C., FRASER, J. A. and KREUTZWISER, R. D.
Waterloo University, (Ontario), Department of Geography.
"Assessment of Flood and Erosion Assistance Programs, Rondeau Coastal Zone Experience, Lake Erie."
This paper evaluated the performance of major Canada and Ontario coastal hazard assistance programs applied during the 1972 and 1975 high-water period. Seven programs were described, and their effectiveness in helping residents and municipalities alleviate flooding and erosion in the Rondeau coastal zone along Lake Erie was examined.
Journal of Great Lakes Research, Vol. 3, No. 1-2, p. 38-45, October 1977.
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Tuebingen University, (West Germany),
Geologisch-Palaontologisches Institute.
"Range, Velocity, and Material Flux of Compaction Flow in Growing Sedimentary Sequences."
In growing sedimentary sequences, range and velocity of vertically ascending pore water (advection) can be determined quantitatively by using a simple graphical method.
Sedimentology, Vol. 24, No. 5, p. 639-655, October 1977.
- 3A. MILLER, M. C., MCCAVE, I. N. and KOMAR, P. D.
Oregon State University, Corvallis, School of Oceanography.
"Threshold of Sediment Motion Under Unidirectional Currents."
Carefully selected data for the threshold of sediment movement under unidirectional flow conditions were utilized to re-examine the various empirical curves that are commonly employed to predict the threshold.
Sedimentology, Vol. 24, No. 4, p. 507-527, August 1977.
- 4A. BAYDIN, S. S.
"Possible Effect of Sediments and Channel Processes on Runoff Redistribution in a River Delta."
When investigating channel processes one should proceed from the energy characteristics of flow and the types of bedload

movements and not from the forms of channel formations and geomorphological relations.

Translated from Trudy Gosudarstvennogo Okeanograficheskogo Instituta, No. 118, p. 116-135, 1974.

5A. JONES, C. M.

Keele University, (England), Department of Geology.

"Effects of Varying Discharge Regimes on Bed-Form Sedimentary Structures in Modern Rivers."

The discharge regimes that occur in modern rivers vary with climate. Where there are large sand waves in a river, these show different responses to flow changes of different speeds and magnitudes.

Geology, Vol. 5, No. 9, p. 576-570, September 1977.

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Rickwoods and Mark Beech, Edenbridge (England).

"Bed Load Transport by Natural Rivers."

If stream power, ω , and sediment transport rate are the following general empirical relation: $I_{sub B}/(\omega - \omega_{sub 0})$ is approximately equal to $((\omega - \omega_{sub 0})/\omega_{sub 0})$ to the $1/2$ power times (Y/D) to the minus $2/3$ power.

Water Resources Research, Vol. 13, No. 2, p. 303-312, April 1977.

7A. ONISHI, Y., JAIN, S. C. and KENNEDY, J. F.

Battelle-Pacific Northwest Labs., Richland, Washington.

"Effects of Meandering in Alluvial Streams."

For a given mean depth and velocity of flow, the sediment discharge per unit width in the full-width meandering channel was found to be greater than that in the straight flume, which in turn was greater than that of the half-width meandering channel.

Proceedings Paper 12248, p. 899-917, July 1976.

8A. ROMASHIN, V. V.

"Properties of Channel Wandering."

The characteristics of channel wandering during structural sediment transport were analyzed from the results of long-term field observations. The river reach under study was the

lowermost 4-km reach of one of the mountain rivers of the Black Sea coast of the Caucasus.

Translated from Trudy Gosudarstvennogo Gidrologicheskogo Instituta, No. 225, p. 5-15, 1975.

- 9A. HADLEY, R. F. and SHOWN, L. M.
Geological Survey, Lakewood, Colorado, Water Resource Division.
"Relation of Erosion to Sediment Yield."
Sediment yield is dependent on the gross erosion in the drainage basin and the transport efficiency of the channel network. The estimated conveyance for the whole basin indicated that only a very small part of the eroded material is presently being transported through the system.
Proceedings of the 3rd Federal Inter-Agency sedimentation Conference, 1976, held at Denver, Colorado, March 22-25, 1976.
- 10A. ENVIRONMENTAL PROTECTION AGENCY.
Boston, Massachusetts, Region I.
"Connecticut River Basin Program, Part III, Phase I, Water Quality Reconnaissance for the Connecticut River Supplemental Study."
Factors primarily responsible for water quality in the Connecticut River, including stream flow variations, and nutrient, sediment and silt loss, are determined.
Available from the National Technical Information Service, Springfield, Virginia 22161.
- 11A. KARASHEV, A. V., BOGALIUBOVA, I. V. and BOBROVITSKAYA, N. N.
Gosudarstvennyi Gidrologicheskii Institut, Leningrad (USSR).
"Water Erosion and Sediment Discharge."
The principles of research into water erosion were considered, interrelationships between the processes of erosion from the slopes of drainage basins and sediment discharge from river basins were given, both on the basis of general theoretical principles as well as with regard to topography, man's activities, etc.
International Association of Hydrological Sciences Publication No. 113, p. 73-77, 1974.

12A. DIAGONU, C.

Institutul De Meteorologi Si Hidrologie, Bucharest (Rumania).

"Erosion Phenomena in Drainage Basins Reflected by Sediment Flow in Rivers (Phenomenes De'Erosion Des Bassins Versants Reletes Par Les Transports Solides Des Cours D'eau)."

The long-term mean values of the sediment discharges, their territorial distribution, the laws of their variation with altitudes, as well as the characteristics of sediment discharges conditioned by the water flow were defined as the main characteristic elements of the sediment flow in rivers which themselves show the state of erosion in a basin.

International Association of Hydrological Sciences Publication No. 113, p. 47-61, 1974.

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"The Erosion Index as a Factor for Determining Turbidity in Rivers (L'Indice D'Erosion-Facteur de de Termination de la Turbidite des Rivieres)."

In determining the average annual sediment discharge P KG/S, the average annual stream turbidity RHO G/CU M, and the sediment modulus Q sub P G/S/SQ KM, in rivers, the erosion index ϵ KG/S and the soil characteristic X were used.

International Association of Hydrological Sciences Publication No. 113, p. 15-20, 1974.

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Geological Survey, Portland, Oregon, Water Resources Division.

"Project Development and Data Programs for Assessing the Quality of the Willamette River, Oregon."

The U. S. Geological Survey recently (1976) completed an intensive river-quality assessment in the Willamette River Basin, Oregon. This circular covers aspects of overall project development and methods and data programs used to assess four river-quality problems.

Available from Branch of Distribution, USGS, 1200 S. Eads St., Arlington, Virginia 22202, Circular 715-C, 1976.

15A. BRIDGES, P. H. and LEEDER, M. R.

Leeds University (England), Department of Earth Sciences and Leeds University (England), Division of Geology.

"Sedimentary Model for Intertidal Mudflat Channels, with Examples from the Solway Firth, Scotland."

Intertidal mudflat channels (gullies) in the Solway Firth, Scotland, possess width/depth ratios similar to meandering rivers. Most channels deeper than L M show cut-bank slides, but narrow, deep channels also have rotational slides on the point-bar slopes.

Sedimentology, Vol. 23, No. 4, p. 533-552, August 1976.

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Applied Hydrology Division.

"Sediment Data, Canadian Rivers 1972."

Tables of sediment data on Canadian rivers are presented.

Inland Waters Directorate, Water Survey of Canada, 1975.

- 17A. DEPARTMENT OF THE ENVIRONMENT, Ottawa (Ontario).
Water Resources Branch

"Sediment Data - Canadian Rivers 1971."

The results of sediment survey investigations in Canada during 1971 have been compiled and presented.

Water Survey of Canada, 1975.

- 18A. MCKENZIE, L. S., III and WALKER, H. J.
Louisiana State University, Baton Rouge, Center for Wetlands Resources, and Louisiana State University, Baton Rouge, Coastal Studies Institute.

"Morphology of an Arctic River Bar."

River bars are a common landscape element in the valleys of the coastal plain of northern Alaska. They are especially numerous in the Coleville River delta.

Available from the National Technical Information Service, Springfield, Virginia 22161.

- 19A. POSEY, C. J.
Connecticut University, Storrs., Department of Civil Engineering.

"Erosion-Proofing Drainage Channels."

A large portion of soil eroded from land is scoured from the beds and banks of natural channels that are dry much of the time.

Journal of Soil and Water Conservation, Vol. 28, No. 2, March-April, 1973.

20A. ESTRUCO, J.

"Method of Protection for Slopes and Crests of Rivers, Channels, and the Like."

A method is disclosed for protecting slopes and crests of rivers, channels, and the like by mooring flexible and permeable tubular casings filled with fresh concrete.

Official Gazette of the United States Patent Office, Vol. 932, No. 3; p. 817, March 18, 1975.

21A. NEW YORK STATE DEPARTMENT OF TRANSPORTATION, Albany.
Bureau of Soil Mechanics.

"Bank and Channel Protective Lining Design Procedures."

Procedures and guidelines are presented for the design of bank and channel protective linings.

Soils Design Procedure, SDP-2, August, 1971.

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Leeds University (England), Department of Earth Sciences.

"Flow Separation in Meander Bends."

The occurrence of flow separation in natural meanders was investigated in channels from the intertidal zone of Solway Firth, Scotland.

Nature, Vol. 253, No. 5490, p. 338-339, January 31, 1975.

23A. BRANSKI, J.
Panstwowy Instytut Hydrologiczno-Meteorologiczny, Warsaw,
(Poland).

"Transport of Suspended Solids Along the Vistula River."

A method is described for preparing a balance of transported solids along the Vistula River on the basis of many years' monitoring and observations of transportation of suspended solids.

Nordic Hydrology, Vol. 5, No. 3, p. 183-192, 1974.

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Environmental Protection Service, Ottawa (Ontario). Ecological
Protection Branch.

"Sedimentation Phenomenon of the Fraser River."

A comprehensive hydrometric and sediment survey was started on the lower Fraser River in 1965.

Proceedings of the International Association for Hydraulic Research Symposium on River Mechanics (4 Vol.), Bangkok, Thailand, January 9-12, 1973.

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Regional Institution of Technology, Jamshedpur (India),
Department of Applied Mechanics.
"Stable Channels in Alluvial Material."
The principles of design of stable channels in coarse non-cohesive material were studied by the application of tractive force analysis.
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Dundee University, Newport-on-Tay (Scotland), Tay Estuary
Research Center.
"Channel Stability in Relation to Buried Unconsolidated
Sediments."
The processes of natural stabilization of the Tay estuary
shipping channel were examined with critical erosion velocity
diagrams.
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Research Symposium on River Mechanics (4 Vol.), Bangkok,
Thailand, January 9-12, 1973.
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Universidad Nacional Autonoma de Mexico, Mexico City,
Department of Civil Engineering.
"Stable Channels in Alluvium."
In order to describe the three degrees of freedom of a stream in
alluvium, three independent equations are needed to determine
its stable shape.
Proceedings of the International Association for Hydraulic
Research Symposium on River Mechanics (4 Vol.), Bangkok,
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Alberta University, Edmonton.
"Comprehensive Graphs of Regime Data."

A discussion was given describing a graphical presentation of stream regime data in which average-steady depth and slope have been achieved by the sediment moved by a flow.

Proceedings of the International Association for Hydraulic Research Symposium on River Mechanics (4 Vol.), Bangkok, Thailand, January 9-12, 1973.

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Chuo University, Tokyo (Japan), Hydraulic Lab.

"On the Cause of Meandering of Rivers."

The cause of the initiation of meandering of rivers was analyzed as a problem of three-dimensional stability of the erodible bed.

Proceedings of the International Association for Hydraulic Research Symposium on River Mechanics (4 Vol.), Bangkok, Thailand, January 9-12, 1973.

30A. BURSALI, S.

State Hydraulic Works, Ankara (Turkey), Department of Research.

"Economic Revetments for Protecting the Banks of Meric and Ergene Rivers Flood Canals Against Wave Erosion."

Flood levees constructed along the Meric and Ergene Rivers to protect agricultural lands against flood damage were observed and studied analytically in order to find out the main cause of damage on the water side slopes.

Proceedings of the International Association for Hydraulic Research Symposium on River Mechanics (4 Vol.), Bangkok, Thailand, January 9-12, 1973.

31A. VOLKART, P., TSCHOOP, J. and BISAZ, E.

Eidgenössische Technische Hochschule, Zurich (Switzerland).

"The Effect of Sills on River Bed."

General statements were derived for the two-dimensional steady stress case on the basis of model tests. Size of the scouring basin between transverse sills in the natural river bed is defined.

Proceedings of the International Association for Hydraulic Research Symposium on River Mechanics (4 Vol.), Bangkok, Thailand, January 9-12, 1973.

32A. MIRTSKHOULAVA, T. E.

Gruzinskii Nauchno-Issledovatel'skii Institut Gidrotekhniki i Melioratsii, Tiflis (USSR).

"Scour in River Basin and in its Bed Mechanism, Forecast."

The amount of washout from watershed slopes as a result of soil water erosion can be determined by suggested equations relating the slope and length.

Proceedings of the International Association for Hydraulic Research Symposium on River Mechanics (4 Vol.), Bangkok, Thailand, January 9-12, 1973.

33A. STICHLING, W.

Department of the Environment, Ottawa (Ontario), Water Resources Branch.

"Sediment Loads in Canadian Rivers."

The history of sediment data program initiated in Canada in 1961 is reviewed, the equipment in use for measuring suspended sediment and bed load is described and the methods used by the water survey of Canada for collecting and processing the data are outlined.

Water Resources Branch, Technical Bulletin No. 74, 27 p. 1974.

34A. KLAGES, M. G., LOGAN, L. D. and HSIEH, Y. P.

Montana State University, Bozeman, Department of Plant and Soil Science.

"Suspended Solids Carried by the Gallatin River of Southwestern Montana: Amounts Carried During Spring Runoff."

Erosion resulting from spring snowmelt and resultant runoff is the major contributor to suspended solids in the Gallatin River.

Northwest Science, Vol. 47, No. 4, p. 203-212, 1973.

35A. NORDIN, C. F. and SABOL, G. V.

Geological Survey, Fort Collins, Colorado.

"Estimating Average Sediment Yields From Annual Streamflow and Sediment Records."

Where simultaneous streamflow and sediment discharge records are available, linear relations between annual streamflow and annual sediment loads can be developed.

Vol. 1 of Proceedings of the International Association for Hydraulic Research, International Symposium on River Mechanics, January 9-12, 1973, Bangkok, Thailand.

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Geological Survey, Reston, Virginia.

"Sediment Transport by Streams Draining into the Delaware Estuary."

The quality of sediment transported by streams draining into the Delaware estuary varies already according to geology, physiography and land use.

Available from GPO, Washington, D. C. 20402.

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Hydrobiologisch Institut, Nieuwersluis (Netherlands).
"Deposition of River Silts in the Rhine and Meuse Delta."
Due to erosion and leaching the rivers contain considerable quantities of silt (mud). It is estimated that the Rhine carries a mean value of 60-70 g/cu m, the variation of the mud content as a function of water discharge shows values up to several hundreds of grams/cu m.
Freshwater Biol. Vol. 3, No. 3, p. 267-281, 1973.
- 38A. NELSON, L. M.
Geological Survey, Tacoma, Washington.
"Sediment Transport by Streams in the Deschutes and Nisqually River Basins, Washington, November 1971-June 1973."
Fluvial-sediment transport was studied in the Deschutes and Nisqually River Basins, Washington.
Open-file Report, 1974.
- 39A. BAKANINA, F. M.
Gorkovskii Gosudarstvennyi Pedagogicheskii Institut (USSR).
"Suspended-Sediment Yield in Rivers of Gor'kiy Oblast as an Indication of Recent Erosion Processes (Stock Vzveshennykh Nanosov V Rekakh Gor'kovskoy Obl.kak Pokazatel' Razvitiya Sovremennykh Eroziionnykh Protsessov)."
The largest areas of eroded soils in Gor'kiy Oblast (20%-50%) are concentrated in the central and Oka-volga regions on the Volga right bank. Soils of the Oblast are eroded mainly by spring melt waters.
Pochvovedeniye, No. 4, p. 131-133, April 1973.
- 40A. DEAN, A. M., JR.
U.S. Army Cold Regions Research and Engineering Laboratory,
Hanover, New Hampshire, USA.
"Remote Sensing of Accumulated Frazil and Brash Ice."

The use of a broad-banded impulse radar system for aerial detection of accumulated frazil and brash ice in a 9.5 km reach of the St. Lawrence River is described.

Proceedings of the Third National Hydrotechnical Conference, Quebec, May 1977, p. 693.

41A. DENHARTOG, S. L.

U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire, USA.

"Air Photo Interpretation of a Small Ice Jam."

Air photos of a small ice jam on the Pemigewasett River near Plymouth, N.H., were taken three days after the jam and compared with photos taken after the ice went out.

Proceedings of the Third National Hydrotechnical Conference, Quebec, May 1977, p. 705.

42A. AUBIN, L. and MCNEIL, N. et.

Société d'Énergie de la Baie James; Asselin, Benoît, Bucharme, Lapointe Inc.

"Influence de régime des glaces sur les ouvrages de dérivation provisoire de LG-2."

The temporary diversion works at LG-2, in operation since almost two years, are located in a La Grande River reach severely affected by ice conditions. A 25 km long stretch of rapids produces in winter months as much as 60 000 m³ of frazil ice which is evacuated through the tunnels.

Proceedings of the Third National Hydrotechnical Conference, Quebec, May 1977, p. 728.

43A. TRIBOULET, PAR JEAN-PIERRE, VERRETTE, JEAN-LOUIS, LLAMAS, et JOSE.

à l'Hydro-Québec; agrégé ai dép. génie civil; à CENTREAU.

"Temperature De L'eau Du Saint-Laurent De Montreal A Quebec."

From water temperature data observed in the St. Lawrence, the authors wish to describe some characteristics of that river.

Proceedings of the Third National Hydrotechnical Conference, Quebec, May 1977, p. 636.

44A. ISMAIL, E., EL-HADI, N. A. and DAVAR, K. S.

Department of Civil Engineering, University of New Brunswick, Fredericton, New Brunswick.

"Effects of Large Roughness on Resistance and Dispersion in Channels."

This paper presents an outline of a tentative classification of ice cover types and the significant effects of some of these types on hydraulic flow conditions.

Proceedings of the Third National Hydrotechnical Conference, Quebec, May 1977, p. 453.

- 45A. HOPPER, H. R., SIMONSEN, C. P. S. and POULIER, W. J. S.
Hydro Development Department Manitoba Hydro; Acres Manitoba Limited.

"Churchill River Diversion Burntwood River Waterway Winter Regime."

During winter, tranquil reaches of the waterway will quickly develop an ice cover while the swifter reaches will remain open and generate large quantities of slush ice. This ice will accumulate under established ice covers in the form of hanging dams and will alter the regime of the river.

Proceedings of the Third National Hydrotechnical Conference, Quebec, May 1977, p. 434.

- 46A. HOLLINGSHEAD, G. W. and RUNDQUIST, L. A.
R. M. Hardy and Associates Ltd., Northern Engineering Services Co. Ltd.

"Morphology of Mackenzie Delta Channels."

The Mackenzie Delta distributes peak flows of about 28,000 m³/s (1,000,000 cfs) through a maze of distributary channels which range in width from two metres to several thousand metres.

Proceedings of the Third National Hydrotechnical Conference, Quebec, May 1977, p. 309.

- 47A. MERCER, A. G. and COPPER, R. H.
Northwest Hydraulic Consultants Ltd., Vancouver; Northwest Hydraulic Consultants Ltd., Edmonton.

"River Bed Scour Related to the Growth of a Major Ice Jam."

The bed scour caused by the formation and release of a major ice jam is a transient phenomena that is to some extent obliterated by the time that measurements of its scope can be safely made.

Proceedings of the Third National Hydrotechnical Conference, Quebec, May 1977, p. 291.

- 48A. FRENETTE, M. D.Sc. Ing., and CARON, O. M.Sc. Ing.
Université Laval, Québec et conseiller technique à la Société d'Energie de la Baie James.

- 52A. PERHAM, R. E.
U.S. Army Cold Regions Research and Engineering Laboratory,
Hanover, New Hampshire.
"Ice and Ship Effects on the St. Marys River Ice Booms."
The St. Marys River connects Lake Superior with Lake Huron. It contains many navigation improvements which make it an important commercial shipping route.
Proceedings of the Third National Hydrotechnical Conference, Quebec, May 1977, p. 419.
- 53A. JOLLY, J. P., PITCHEN, M. J. R. G., SOLOMON, S. I. and WAROWAY, A.
Shawinigan Engineering Company Limited; University of Waterloo, Waterloo, Ontario; Water Resources Branch, Department of Indian and Northern Affairs Ottawa.
"Flood Magnitude Determination From Channel Width Measurements."
A method relating channel widths to flood magnitude provides a good alternative, the method soundness was determined in a study on streams in the Yukon and Northwest Territories between the 60th and 66th parallels of latitude.
Proceedings of the Third National Hydrotechnical Conference, Quebec, May 1977, p. 45.
- 54A. KANE, D. L. and CARLSON, R. F.
Water Resources, Institute of Water Resources, Univeristy of Alaska, Fairbanks, Alaska.
"Analysis of Stream Aufeis Growth and Climatic Conditions."
Small streams and braided rivers in the north undergo the function of surface ice during the winter season.
Proceedings of the Third National Hydrotechnical Conference, Quebec, May 1977, p. 656.
- 55A. KELLERHALS, R., M. CSCE: CHURCH, M. and DAVIES, L. B., M. CSCE.
"Morphological Effects of Interbasin River Diversion."
Data on the morphological effects of sixteen Canadian interbasin river diversions are presented and a few of the better-documented cases are discussed and illustrated. A classification of diversion routes is suggested and procedures for evaluating the morphological effects in each classification are proposed.
Proceedings of the Third National Hydrotechnical Conference, Quebec, May 1977, p. 833.

Suspended sediment yields were determined for 36 basins and dissolved sediment yields for 21 intermediate-sized stream basins in southern Alberta, Canada.

Journal of Hydrology; North-Holland Publishing Company; P.O. Box 211; Amsterdam; Netherlands.

60A. SCOTT, K. M.

"Effects of Permafrost on Stream Channel Behavior in Arctic Alaska."

Sites with drainage areas ranging from 88 to 12,200 km² were monitored on five streams in northern Alaska during the breakup in 1976 to determine (1) the effects of frozen bed and bank material on channel behavior, and (2) the importance of the annual breakup flood in forming the channels of arctic streams.

Geological Survey Professional Paper 1068, p. 17-19.

61A. TIPPNER, M.

Bundesanstalt fuer Gewaesserkunde, Coblenz (West Germany).

"On the Extent of Bottom Erosion in Large Rivers (Ueber Den Umfang Der Schlenerosion in Grossen Gewaessern)."

As a result of tributary regulation, large rivers such as the Rhine, Elbe, and Danube have been cut off, to a considerable extent, from their original bedload supply sources.

Deutsche Gewaesserkundliche Mitteilungen, Vol. 17, No. 5, p. 125-130, October 1973.

62A. LUTERNAUER, J. L. and MURRAY, J. W.

British Columbia University, Vancouver, Department of Geological Sciences.

"Sedimentation on the Western Delta-Front of the Fraser River, British Columbia."

Sedimentation and erosion on the western delta-front of the Fraser river, Canada are described on the basis of a detailed sedimentological survey and three successive bathymetric surveys.

Canadian Journal of Earth Sciences, Vol. 10, No. 11, p. 1642-1663, 1973.

63A. Akademiya Nauk SSSR, Moscow, Institut Vodnykh Problem.

"Dynamics and Thermal Regimen of River Flows (Dinamika I Termika Rechnykh Potokov)."

Preliminary results are presented of theoretical and experimental investigations conducted in 1969-70 at the Department of Hydrophysics of the USSR Academy of Science's Institute of water problems.

Izdatel' Stovo 'Nauka', Moscow, K. I., Rossinkiy, Editor, 1972.

- 64A. HAMPTON, K.
Arkansas Wildlife Federation, Little Rock.
"Stream Channelization." (A Critique of CEQ'S Channelization Report).
Following the publication of the final report on stream channel modification prepared for the President's Council on Environmental Quality.
Arkansas Out-of-Doors, Vol. 2, No. 6, p. 2, June 1973.
- 65A. "Soil Erosion and Transport of Solids by Streams." (Erosion du Sol et Transports Solides des Cours D'eau).
Research in erosion by water, sedimentation in deltas and dams the mechanisms of transport (especially of bed-loads), the relations between fluid and solid discharge, radioisotopes, and other methodological studies are reviewed.
Status and Trends of Research in Hydrology, 1965-74.
- 66A. BOBROVITSKAYA, N. N.
Gosudarstvennyi Gidrologicheskii Institut, Leningrad (USSR).
"Relation of Average Long-Term Suspended-Sediment Yield of Streams in European Russia to Physiographic Factors (Zavisimost' Srednego Mnogoletnego Stoka Vzveshennykh Nanosov Rek Yevropeyskoy Territorii SSSR ot Fiziko-Geograficheskii Kh Faktorov)."
Analysis of suspended-sediment yield within zones is based on multiple correlation methods and consideration of differences in stream gradients and forested and plowed areas.
Gosudarstvennyy Gidrologicheskii Institut Trudy, No. 191, p. 68-84, Leningrad, 1972.
- 67A. LISITSYNA, K. N. and ALEKSANDROVA, V. I.
Gosudarstvennyi Gidrologicheskii Institut, Leningrad (USSR).
"Sediment Yield of Streams in European Russia (Stok Nanosov Rek Yevropeyskoy Territorii SSSR)."

Sediment yield of large rivers in the White, Barents, Baltic, Black, Azov, and Caspian Sea basins is tabulated.

Gosudarstvennyy Gidrologicheskiy Institut Trudy, No. 191, p. 28-52, Leningrad, 1972.

68A. Gosudarstvennyi Gidrologicheskii Institut, Leningrad (USSR).

"Regime, Theory, and Methods of Calculation and Measurement of Sediments and Waste Waters (Rezhim, Teoriya, Metody Rascheta I Izmereniya Nanosov I Stochnykh Vod)."

Investigations are made of suspended-load and bed-load discharges, size composition of bottom sediments, and settling velocity of natural sediment grains. Recommendations are given for computing sediment yield of ungaged rivers in European Russia.

Gosudarstvennyy Gidrologicheskiy Institut Trudy, No. 191, A. V. Karashev, and I. V. Bogolyubova, Editors, Leningrad, 220 p., 1972.

69A. LEOPOLD, L. B.

Geological Survey, Berkeley, California.

"River Channel Change with Time: An Example."

Despite the trend toward increasing cross-sectional area, the net result after 20 years was a channel smaller by 20% than it had been originally. Urbanization did not alter the rate of channel migration.

Geological Society of American Bulletin, Vol. 84, No. 6, p. 1845-1860, June 1973.

70A. LINDNER, C. P. and FENWICK, G. B.

Committee on Channel Stabilization (Army).

"Chena River Lakes Project, Alaska, Problems Relating to Channel Development, Erosion, and Bank and Levee Protection."

This report is published by the Committee on Channel Stabilization primarily in furtherance of their objective, with respect to channel stabilization, to provide and advice on design and operational problems; and to review and evaluate pertinent information and disseminate results thereof.

U. S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi, March 1973.

71A. HARTSHORN, J. H. and ASHLEY, G. M.

Massachusetts University, Amherst, Coastal Research Center.

"Glacial Environment and Processes in Southeastern Alaska."

The dominant surficial geologic processes in southeastern Alaska are glaciation and stream action. Glaciers erode bedrock, sculpture characteristic landforms, and deposit subglacial and marginal debris.

Technical Report No. 4-CRC, August 1972.

72A. HAKANSON, L.

Uppsala University, (Sweden), Department of Physical Geography.

"The Meandering of Alluvial Rivers."

The formation of meanders is explained by basic physical principles of flowing turbulent water and its interaction with the river bed.

Nordic Hydrology, Vol. 4, No. 2, p. 119-218, 1973.

73A. AYZENBERG, M. M., VOL'FTSUN, M. L., KHLOYEVA, YE. V. and YABLONSKIY, V. V.

Ukrainskii Nauchno-Issledovatel'skii Gidro-Meteorologicheskii Institut, Kiev (USSR).

"Investigation of Mudflows in the Cheremosh River Basin in Connection with Design of the Rostoki Reservoir (Issledovaniye Seley v Basseyne R. Cheremosh V Svyazi S Proyektirovaniyem Rostokinskogo Vodokhranilishcha)."

The proposed area of the Rostoki Reservoir on the Cheremosh River is located in the southeastern region of the Carpathians, where mudflow occurrence is most frequent.

Formirovaniye I raschety Elementov Rezhima Rek; Ukrainskiy Nauchno-Issledovatel'skiy Gidrometeorologicheskii Institut Trudy, No. 119, p. 95-105, Moscow, 1972.

74A. AYZENBERG, M. M.

Ukrainskii Nauchno-Issledovatel'skii Gidro-Meteorologicheskii Institut, Kiev (USSR).

"Role of Natural and Anthropogenic Factors in Mudflow Formation in the Ukrainian Carpathians (O Roli Prirodnykh I Antropogennykh Faktorov V Seleobrazovanii V Ukrainskikh Karpatakh)."

The combination of geodynamic conditions and hydrometeorological factors favors the formation of mudflows in the Ukrainian Carpathians.

Gidrometeorologicheskii Institut Trudy, No. 119, p. 84-94, Moscow, 1972.

- 75A. OMAN, G. E.
Soil Conservation Service, Upper Darby, Pennsylvania.
"Criteria for Stable Earth Channel Design."
In determining stability of an earth channel against erosion, the Soil Conservation Service uses either the allowable velocity or the allowable tractive stress methods. Both are based on the principle of the threshold of particle movement.
Paper 72-763, 1972 Winter Meeting American Society of Agricultural Engineers, Chicago, Illinois, December 1972.
- 76A. MANSUE, L. J. and COMMINGS, A. B.
Geological Survey, Philadelphia, Pennsylvania.
"Sediment Transport by Streams Draining into the Delaware Estuary."
The quantity of sediment transported by streams draining into the Delaware estuary from Pennsylvania, New Jersey, and Delaware varies really according to geology, physiography, and land use.
Geological Survey Open-File Report, 1973.
- 77A. GILL, D.
Alberta University, Edmonton, Department of Geography.
"Modification of Levee Morphology by Erosion in the MacKenzie River Delta, Northwest Territories, Canada.
Both erosion and unequal deposition of sediments control the gross morphology of arctic deltas.
Polar Geomorphology; Institute of British Geographers Special Publication No. 4, p. 123-138, June 1972.
- 78A. SANOYAN, V. G.
Akademiya Nauk Armyanskoi SSR, Erevan, Institut Agrokhimicheskikh Problem I Hidroponiki.
"Calculation of the Process of Sedimentation and Hydraulic Washout of River Reservoir."
In order to solve the equation describing the process of silting and scouring of reservoirs, first the integral convective exchange is established, taken over all the moving volume.
Proceedings of 14th Congress of International Association for Hydraulic Research, Paris, August 29-September 3, 1971.
- 79A. ONGLEY, E. D.
Queen's University, Kingston (Ontario), Department of Geography.
"Sediment Discharged from Canadian Basins into Lake Ontario."

Regional patterns of sediment yield from Canadian watersheds tributary to Lake Ontario were obtained by using suspended and dissolved sediment and flow data originally obtained by government agencies for other purposes.

Canadian Journal of Earth Sciences, Vol. 10, No. 2, p. 146-155, February 1973.

- 80A. WRIGHT, L. D. and COLEMAN, J. M.
Louisiana State University, Baton Rouge, Coastal Studies Institute.

"Variations in Morphology of Major River Deltas as Functions of Ocean Wave and River Discharge Regimes."

River-dominated shoreline configurations result only when the river is able to build flat offshore profiles; where the subaqueous slope is steep, wave-built shoreline landforms dominate the delta.

American Association of Petroleum Geologists Bulletin, Vol. 57, No. 2, p. 370-398, February 1973.

- 81A. FERGUSON, R. I.
Hull University (England), Department of Geography.

"Sinuosity of Supraglacial Streams."

Measurements of the flow and channel form of supraglacial streams, mostly perennial, on a Swiss valley glacier are analyzed for comparison with normal alluvial rivers.

Geological Society of America Bulletin, Vol. 84, No. 1, p. 251-255, January 1973.

- 82A. MACKAY, J. R. and MATHEWS, W. H.
British Columbia University, Vancouver, Department of Geography.

"Geomorphology and Quaternary History of the MacKenzie River Valley Near Fort Good Hope, N.W.T., Canada."

The MacKenzie River valley has a sharp change in geomorphic character at the ramparts, a postglacially developed rock-walled canyon near Fort Good Hope, N.W.T., Canada. Upstream for at least 70 km the river is cut into late-glacial and early postglacial lacustrine, deltaic, and floodplain sediments with radiocarbon dates of 11,000 to 11,500 years.

Canadian Journal of Earth Sciences, Vol. 10, No. 1, p. 26-41, January 1973.

- 83A. HENRICKSON, G. E. and DOONAN, C. J.
Geological Survey, Lansing, Michigan.
"Hydrology and Recreation on the Cold-Water Rivers of Michigan's Southern Peninsula."
Recreational values are generally benefitted by a relatively uniform streamflow and a high sustained flow even during drought periods. Other valued qualities are clear water free from objectionable containinants and river banks that are protected from erosion.
Geological Survey Water Information Series Report 3, 1972.
- 84A. BOZINOVIC, M.
Institut Za Vodoprivredu Jaroslav Cernt, Belgrade (Yugoslavia).
"Effect of Flow Variation Downstream of a Power Plant on the Bedload Discharge of Alluvial Rivers."
Periodic waves caused by powerplant operation may under certain conditions provoke a considerable increase of the total daily bed load balance in relation to the corresponding balance in steady flow. If such waves occur during a longer time interval then they may considerably influence the total annual bed load balance.
Proceedings of 14th Congress of International Association for Hydraulic Research, Paris, August 29-September 3, 1971, Vol. 3, p. 283-290, 1972.
- 85A. ARTAMONOV, K. P., TALMAZA, V. P. and KROCHKINE, A. N.
Akademiya Nauk Kirgizskoi SSR, Frunze, Institut Vodnogo Khozyaistva I Energetiki.
"On the Hydromorphometry of Alluvial Beds of Mountain Rivers Composed of Heterogeneous Materials." (Questions D'hydromorphometrie Des Lits Alluviaux Des Cours D'Eau de Montagne Formes de Materiaux Heterogenes).
In alluvial beds composed of heterogeneous material, it is possible to define the mechanical structure of the sediments, characteristic diameters, Karman's parameters, vertical velocity distribution, Chezy's coefficients, stable roughness, width, average depth, scour velocity, stable longitudinal inclination, and the maximum depth of the bed erosion.
Proceedings of 14th Congress of International Association for Hydraulic Research, Paris, August 20-September 3, 1971.
- 86A. KNOROZ, V. S.
Politekhnicheskii Institut, Leningrad (USSR).
"Natural Armouring and Its Effect on Deformations of Channel Beds Formed by Materials Non-Uniform in Size."

The mechanism of natural sedimentary armouring is described. Formulae are given for calculating the depth of scour and the mean flow velocity at which armouring is completed.

Proceedings of 14th Congress of International Association for Hydraulic Research, Paris, August 29-September 3, 1971., Vol. 3, p. 35-42, 1972.

- 87A. MIRTSKHOULAVA, T. E. and MAGOMEDOVA, A. V.
Gruzinskii Nauchno-Issledovatel'skii Institut Gidrotekhniki i Melioratsii, Tiflis (USSR).

"Prognosis of General Deformation of Natural and Artificial Alluvial Beds Composed of Non-Uniform Material."

The coarsening resulting in natural pavement of the surface layer of noncohesive material with scour is characterized by a mean diameter of suspended particles, the value of which varies in the process of scour.

Proceedings of 14th Congress of International Association for Hydraulic Research, Paris, August 29-September 3, 1971.

- 88A. GUNTER, A.
Eidgenoessische Technische Hochschule, Zurich (Switzerland),
Lab of Hydraulic Research and Soil Mecha.

"Critical Mean Erosive Force, Considering Fluctuations Due to Turbulence, of the Erosive Force Acting on an Alluvial Bed (Force D'Entrainement Moyenne Critique, Avec Prise en Consideration Des Fluctuations Dues a La Turbulence, De L A Force D'Entrainement Agissant Sur Le Materiau D'Un Lit Alluvionnaire)."

An interruption of the bed-load transport in an alluvial channel causes a deformation of the bed. A gradual change of the longitudinal slope continues until the hydromechanical stress reaches a critical value.

Proceedings of 14th Congress of International Association for Hydraulic Research, Paris, August 29-September 3, 1971.

- 89A. "Report of the Chief of Engineers to the Secretary of the Army on a Study of Streambank Erosion in the United States."

Only one percent of the nation's streams have been subjected to prior study. Eight percent of total stream bank miles are currently experiencing erosion to some degree. A candid admission of data insufficiency and inaccuracy is included.

Report of House Commission on Public Works, 91st Congress, 1st Session (October 1969).

- 90A. WILSON, L.
Environment Consultants, Inc., New York.
"Seasonal Sediment Yield Patterns of U.S. Rivers."
The prediction of sediment yield requires that separate consideration be given to those factors affecting runoff and those affecting sediment concentration.
Water Resources Research, Vol. 8, No. 6, p. 1470-1479, December 1972.
- 91A. SMART, J. S.
Thomas J. Watson Research Center, Yorktown Heights, N.Y.
"Quantitative Characterization of Channel Network Structure."
The most commonly used quantitative parameters for characterizing channel networks are derived from a Horton analysis and include bifurcation ratios and stream length ratios.
Water Resources Research, Vol. 8, No. 6, p. 1487-1496, December 1972.
- 92A. ARMY ENGINEER DISTRICT, Walla Walla, Washington.
"Long Hollow Creek Channel Clearing, Nez Perce, Idaho." (Final Environmental Impact Statement).
This project involves the clearing and reshaping of the channel and the seeding of grass throughout a 5,000-foot reach of Long Hollow Creek through the village of Nez Perce, Idaho.
Available from the National Technical Information Service as EIS-ID-72-4562-F.
- 93A. BUREAU OF RECLAMATION, Amarillo, Texas, Region 5.
"Pojoaque Unit, San Juan-Chama Project, Colorado-New Mexico." (Draft Environmental Impact Statement).
The proposed project, part of the upper Colorado River storage project, is the construction of the Nambe Falls Dam and Reservoir.
Available from the National Technical Information Service as EIS-NM-72 4732-D.
- 94A. L'VOVICH, M. I.
Akademiya Nauk SSSR, Moscow, Institut Geografit.
"Rivers of the USSR (Reki SSSR)."
Water balance and water resources of the USSR and analysis and classification of river regimes are discussed. Practical

recommendations on the use of river water are presented. (JOSEFSON-USGS).

Izdatel'stvo 'Mysl', Moscow, 1971.

- 95A. BRADLEY, W. C., FAHNESTOCK, R. K. and ROWEKAMP, E. T.
Colorado University, Boulder, Department of Geological Sciences.

"Coarse Sediment Transport by Flood Flows on Knik River, Alaska."

Knik River of southern Alaska is a glacial river with a valley train which was, until recently, swept each summer by a brief large flood resulting from the sudden drainage of an ice-dammed lake (Lake George).

Geological Society of America Bulletin, Vol. 83, No. 5, p. 1261-1284, May 1972.

- 96A. ABOLTYN'SH, O. P.
All-Union Research Institute of Marine Geology and Geophysics, Riga (USSR).

"Development of the Gauya River Valley (Razvitiye Doliny Reki Gauya)."

The Gauya River, which rises in the Vidzeme hills and flows in a winding course to the Gulf of Riga, is the second longest river in Latvia. Present degradational and aggradational processes are represented by slow downcutting of the river, accompanied by valley widening.

"Zinatne", Riga, 1971.

- 97A. MADDOCK, T., JR.
Geological Survey, Tucson, Arizona.

"Hydraulic Relations for Sand-Bedded Streams."

A good forecast can be made of the change in stream behavior owing to changes in a number of variables, such as discharges of water and sediment, sediment size, and temperature, given a sand-bedded stream channel and some knowledge of bank resistance.

Sedimentation, Symposium to Honor Professor H. A. Einstein, June 17-19, 1971.

- 98A. WARREN, C. R.
Geological Survey, Washington, D. C.

"Pre-Wisconsin Glacial Diversion of the Housatonic River in Northwestern Connecticut."

The Housatonic River was diverted from its preglacial valley at least once, and probably twice, in the part of its course 0.2-0.6 mile below west Cornwall, Connecticut.

Available from GPO, Washington, D. C. 20402.

99A. NELSON, L. M.

Geological Survey, Tacoma, Washington, Water Resources Division.

"Sediment Transport by Stream in the Snohomish River Basin, Washington, October 1967-June 1969."

Annually, most of the sediment transport in streams of the Snohomish River basin is discharged in a few days during periods of high streamflow.

Geological Survey Open-File Report, 1971.

100A. HANDS, E. B.

United States Lake Survey, Detroit, Michigan.

"A Geomorphic Map of Lake Michigan Shoreline."

The shoretypes of Lake Michigan are: unconsolidated bluffs, formed where moraines intersect the shoreline; dunes, restricted primarily to the eastern shore; deltas, found in Green Bay; rock exposures; marshes; swamps; and low dry plains.

Proceedings Thirteenth Conference on Great Lakes Research, April 1-3, 1970, State University College, Buffalo, New York.

101A. ZHUKOVSKIY, YU. S.

"Erosion-Aggradational Relief of the Olenek River and of the Left Bank of the Lower Lena (Eroziionno-Akkumulyativnyy Rel'yef Basseyna R. Oleneka i Levoberezh'ya Nizhney Leny)."

The structure of river valleys of the Olenek River and of the left bank of the lower Lena River was described in terms of their dimensions, slopes, and transverse profiles.

Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva, Vol. 102, No. 1, p. 10-17, January-February 1970.

102A. SCHUMM, S. A.

Colorado State University, Fort Collins, Department of Geology.

"River Metamorphosis."

Data collected from stable alluvial rivers on the great plains of western United States and on the riverine plain of southeastern Australia are used to demonstrate that channel width, depth, shape, meander wavelength, sinuosity and gradient are

significantly related to the quantity of water and to the type of sediment load moving through these channels (ratio of bed-material load to total sediment load).

ASCE Proc., J. Hydraul. Divi., Vol. 95, No. HY1, Paper 6352, pp. 255-273, January 1969.

103A. DOUGLAS, I.

Hull University, (England), Department of Geography.

"Man, Vegetation and the Sediment Yields of Rivers."

Reconnaissance studies in a wide range of climatic conditions in Australia suggest that sediment yields of many rivers draining areas of long human use are far in excess of yields of the geological past.

Nature, Vol. 215, No. 5104, pp. 925-928, August 26, 1967.

104A. MORISAWA, M.

Antioch College, Yellow Springs, Ohio.

"Streams-Their Dynamics and Morphology."

A textbook for beginning students of quantitative geomorphology presents the basic principles of fluid mechanics, open-channel hydraulics, and hydrology, as well as some recent work in quantitative geomorphology.

Earth and Planetary Science Series Publ. 175 P, 1968.

105A. HOLEMAN, J. N.

Soil Conservation Service Hyattsville, Maryland.

"The Sediment Yield of Major Rivers of the World."

The amount of suspended sediment transported by rivers to the seas each year is tabulated. Major rivers are ranked in order of tons of sediment transported per year; drainage area and water discharge data are included.

Water Resources Research, Vol. 4, No. 4, pp. 737-747, August 1968.

106A. SELLIN, R. H. J.

Queen's University, Belfast (Northern Ireland), Department of Civil Engineering.

"Flow in Channels."

This book is intended mainly for students of hydraulic engineering who have already gained a basic knowledge of fluid mechanics and who wish to study the hydraulics of open channels.

New York, New York, Gordon and Breach Science Publishers Inc., 1970.

- 107A. RATZLAFF, J. R.
 Kansas University, Lawrence, Department of Geography.
 "Changes in Channel Pattern and Sinuosity of the Kansas River--
 Causes and Effect Relationship or Random Process."
 Changes in stream morphology can be deterministic (alterations
 of variables within the physical system by climatic or cultural
 influences and effects) or probabilistic (random processes).
 Kansas University Water Resources Research Institute Report,
 1971.
- 108A. SOUTHARD, J. B., YOUNG, R. A. and HOLLISTER, C. D.
 Massachusetts Institute of Technology, Cambridge, Department of
 Earth and Planetary Sciences.
 "Experimental Erosion of Calcareous Ooze."
 Flume experiments on the erosion of abyssal calcareous ooze in
 shallow uniform flows of sea water show that erosion velocities
 range from 7-10 cm/sec soon after rapid deposition of the bed
 to 15-20 cm/sec after a few tens of hours.
 Journal of Geophysical Research, Vol. 76, No. 24, p. 5903-5909,
 August 20, 1971.
- 109A. HANSEN, E. A.
 Forest Service (USDA), Cadillac, Michigan, North Central Forest
 Experiment Station.
 "Sediment in a Michigan Trout Stream--Its Source, Movement, and
 Some Effects on Fish Habitat."
 A sediment budget was constructed from 3 years of measurements
 on a pool and riffle stream. Total sediment load increased five
 times along a 26-mile length of stream; most sediment came from
 204 eroding banks.
 Forest Service Research Paper NC-59, 1971.
- 110A. MU, N. K.
 Leningrad State University, (USSR).
 "River Terraces and Characteristics of Recent Sediment Accumula-
 tion in Mountain Valleys as Illustrated by the Crimean Mountains
 (Rechnyye Terrasy I Osobennosti Sovremennoy Akkumulyatsii V
 Gornyykh Dolinakh na Primere Gornogo Kryma)."
 The role of talus and colluvium in the alluvial structure of
 Crimean Mountain Valleys is examined in connection with geo-
 morphological investigations conducted in 1962-66 and again in
 1969.
 Leningradskiy Gosudarstvennyy Universitet Vestnik No. 6; Seriya
 Geologiya i Geografiya, No. 1, p. 135-141, March 1971.

- 111A. BOUCHER, P. R.
Geological Survey, Washington, D. C.
"Sediment Transport by Streams in the Palouse River Basin, Washington and Idaho, July 1961-June 1965."
The average annual sediment discharge of the Palouse River at its mouth was about 1,580,000 tons per year, and the estimated average annual sediment yield was 480 tons per square mile.
The Superintendent of Documents U. S. Government Printing Office, Washington, D. C. 20402.
- 112A. TANNER, W. F.
Florida State University, Tallahassee, Department of Geology.
"The River Profile."
The long profile of a representative natural stream is composed of segments, each of which is exponential, or nearly so.
Journal of Geology, Vol. 79, No. 4, p. 482-492, July 1971.
- 113A. COLLINSON, J. D.
Keele University (England), Department of Geology.
"Some Effects of Ice on a River Bed."
Morphological activity on ice on the bed of the Tana River of Finnmark, Norway, during the spring flood is concentrated into a short period of time when water stage is changing rapidly. Ice affects the bed in four ways.
Journal of Sedimentary Petrology, Vol. 41, No. 2, p. 557-564, June 1971.
- 114A. ZHUKOVSKIY, S. YA.
All-Union Designing, Surveying and Scientific Research Institute, Leningrad (USSR).
"Effect of Erosional Downcutting of River Valleys on Karst Development (Vliyaniye Eroziionnogo Vreza Rechnykh Dolin na Razvitiye Karsta)."
In surveying karstic areas for building hydraulic power stations, attention should be paid to the history of river valleys which exhibit ancient and recent erosional downcutting.
Vestnik Moskovskogo Universiteta: Geografiya, No. 3, p. 123-128, May-June 1968.
- 115A. STEPANOVA, A. I.
"Sediment Discharge of Rivers in the Maritime Territory (Russian: Stok Nanosova Rek Primorskogo Kraja)."

Average long-term suspended sediment discharge of rivers was computed in the maritime territory. The variation in annual sediment discharge was examined and compared with the variation in water discharge.

Sediments and Waste Waters--The Regime, Theory, Calculation and Measurement (Rezhim, Teoriya, Metody Rascheta i Izmereniya Nanosov i Stochnykh Vod), Gosudarstvennyy Ordena Trudovogo Krasnogo Znameni Hidrologicheskiiy Institut Trudy, No. 156; Gidrometeoizdat, Leningrad, p. 96-104, 1968.

- 116A. VOJNICH-SJANOJENSKY, T. G., GOGELIANY, L. D. and KALANDADZE, B. I.
Zakavkazskii Nauchno-Issledovatel'skii Gidrometeorologicheskii Institut, Tiflis (USSR).

"Hydraulic Theory for the Bottom Stream Movement of the River Bed Sediment on the Landward Side of the Shelf Edge in Estuaries."

A one-dimensional theory of movement is given for river flow with high sediment concentration over a river-bar and great drop in depth at the bottom of submerged canyons near the river mouth.

Proceedings of the Bucharest Symposium May 6-14, 1969: International Association of Scientific Hydrology-UNESCO Co-edition, p. 128-137, 1970.

- 117A. BURGI, P. H. and KARAKI, S.
Bureau of Reclamation, Denver, Colorado, Hydraulics Machinery Branch; and Colorado State University, Fort Collins.

"Seepage Effect on Channel Bank Stability."

Canal side slope stability is related to groundwater hydraulic gradient, channel flow velocity and initial side slope angle.

ASCE Proceedings, Journal of the Irrigation and Drainage Division, Vol. 97, No. IR-1, Paper 7968, p. 59-72, March 1971.

- 118A. KRYUCHKOV, N. I. and MLYNSKIY, V. V.

"A Method of Protecting Banks of the Amu-Darya River (Russian: Sposob Krepleniya Beregov Reki Amu-Dar'I)."

To protect the banks of the river it is recommended that rocks be dumped into excavated trenches along the projected line of erosion, provided that rock interlayers or thick layers of clay are present at the bottom limits of the erosion. River banks may be given the necessary configuration and the direction of flow may be changed at will.

Gidrotekhnika i Melioratskiya, No. 1, p. 44-47, January 1971.

119A. STAROSTINA, I. V.

"Possibility of Predicting Water Turbidity as Illustrated by the Oka River Basin (Russian: O Vozmozhnostipredskazaniya Mutnosti Vody Na Primere Rek Basseyna Oki)."

The Oka River basin near Kaluga was studied with respect to methodology applications for predicting water turbidity.

Meteorologiya I Gidrologiya, No. 12, p. 73-79, December 1970.

120A. MACK, F. J.

Corps of Engineers, Rock Island, Illinois.

"Sediment Yields in the Upper Mississippi River Basin."

The upper Mississippi River basin drains an area of 18,000 square miles. The drainage system includes portions of seven states in north-central United States. The basin is relatively low-lying and gently to moderately rolling in character.

Proceedings of a Seminar on Sediment Transport in Rivers and Reservoirs, Corps of Engineers Hydrologic Engineering Center, April 7-9, 1970.

121A. Corps of Engineers, Davis, California, Hydrologic Engineering Center.

"Sediment Transport in Rivers and Reservoirs."

A U. S. Army Corps of Engineers seminar was held to discuss sedimentation problems. Sediment problems encountered in water resource projects may be classified as either technical or institutional.

Thomas, W. A., Editor, Proceedings of a Seminar on Sediment Transport in Rivers and Reservoirs, Corps of Engineers Hydrologic Engineering Center, April 7-9, 1970.

122A. MCPHERSON, H. J.

Alberta University, Edmonton.

"Dissolved, Suspended and Bed Load Movement Patterns in Two O'Clock Creek, Rocky Mountains, Canada, Summer, 1969."

During the summer of 1969, 12850 tons of material were removed as suspended sediment load, 440 tons as dissolved load and 65 tons as bed load from Two O'Clock Creek basin in the Canadian Rockies.

Journal of Hydrology, Vol. 12, No. 3, p. 221-233, February 1971.

- 123A. KUNKLE, S. H. and COMAR, G. H.
Agricultural Research Service, Danville, Vermont; and Agricultural Research Service, Beltsville, Maryland.
"Estimating Suspended Sediment Concentrations in Stream by Turbidity Measurements."
Turbidity and suspended sediment analyses were made on stream samples collected in the sleepers river watershed of north-eastern Vermont.
Journal of Soil and Water Conservation, Vol. 26, No. 1, p. 18-20, January-February 1971.
- 124A. DORT, W. JR. and RATZLAFF, J. R.
Kansas Water Resources Research Institute.
"Recent Variations in Course and Regimen, Kansas River and Nearby Reaches of Missouri River."
Changes in stream morphology can be deterministic (alterations of variables within the physical system by climatic or cultural influences and effects) or probabilistic (random processes).
Available from National Technical Information Service as PB-197 593.
- 125A. SHULITS, S. and HILL, R. D., JR.
Pennsylvania State University, University Park, Department of Civil Engineering.
"Bedload Formulas, Part A. A Selection of Bedload Formulas. Part B. Program Listings for Bedload Formulas."
Formulas for computing bedload are reviewed, and fortran program listings are given for digital computer solution of 14 of them.
Available from National Technical Information Service as PB-194 950.
- 126A. SIMONS, D. B. and RICHARDSON, E. V.
"Resistance to Flow in Alluvial Channels."
U.S. Geol. Survey Prof. Paper 422-J, 61 p, 1966.
- 127A. GILFILIAN, R. E., LINE W. L. and OSTERKAMP, T.
"Ice Formation in a Small Alaskan Stream, UNESCO-5."
Properties and Process of River and Lake Ice.

128A. SIMONS, D. B.

"The Effect of Water-Resources Development on Rivers and River Systems."

Published in the Proceedings of the International Conference on Water for Peace, Washington, D. C.

129A. SIMONS, D. B. and HAMILTON, J. M.

"Stabilization of Channels in Coarse, Non-Uniform Bed Material."

Paper presented at the Hydraulics Division ASCE 17th Annual Specialty Conference, Utah State University, Logan, Utah, August 1969.

130A. SIMONS, D. B. and STEVENS, M. A.

"Response of Sand Bed Rivers to Changing Discharge."

Paper presented at the ASCE National Water Resources Engineering Meeting, Atlanta, Georgia, January 1972.

131A. STEVENS, M. A., CHEN, Y. H. and SIMONS, D. B.

"Riverbank Recessions for Power Plant Facilities, Section 9."

River Structures, Proceedings Issue, Vol. 1, Modeling Techniques, Symposium on Modeling Techniques, San Francisco, California, September, 1975.

132A. SIMONS, D. B.

"Connecticut River Streambank Erosion Study."

Progress Report prepared for the Connecticut River Streambank Erosion Study, Massachusetts, New Hampshire, and Vermont, July 1978.

133A. SIMONS, D. B., RICHARDSON E. V. and NORDIN, C. F., JR.

"Sedimentary Structures Generated by Flow in Alluvial Channels."

Paper Presented at the 38th Annual Meeting, Society of Economic Paleontologists and Mineralogists, Toronto, Canada, May 18, 1964, published in Primary Sedimentary Structures and Their Hydrodynamic Interpretation, S.E.P.M. Spec. Publication No. 12, 1965.

134A. BISHOP, A. A., SIMONS, D. B. and RICHARDSON, E. V.

"Total Bed Material Transport."

ASCE Journal of Hydraulics Division, Vol. 91, HY2, CER64AAB-DBS-EVR21, 1965.

- 135A. SIMONS, D. B. and MILLER C. R.
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B. MATHEMATICAL MODEL-LABORATORY INVESTIGATIONS
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A numerical model for channel alterations was developed for sand bed rivers and deltas. The unsteady river flow was computed using the continuity equation and momentum equation of flow with prescribed boundary conditions.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol. 103, No. HY12.
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A two-dimensional finite element model that simulates erosion, transport, and deposition of suspended sediments is presented.
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- 3B. MILLER, M. C., MCCAIVE, I. N. and KOMAR, P. D.
Oregon State University, Corvallis, School of Oceanography.
"Threshold of Sediment Motion Under Unidirectional Currents."
Carefully selected data for the threshold of sediment movement under unidirectional flow conditions were utilized to re-examine the various empirical curves that are commonly employed to predict the threshold.
Sedimentology, Vol. 24, No. 4, p. 507-427, August 1977.
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Ecole Polytechnique Federale de Lausanne (Switzerland), Laboratoire D'Hydraulique.
"Deposition and Erosion in an Alluvial Channel (Les Phenomenes de Deposition et D'Erosion dans un Canal Alluvionnaire)."
Deposition and erosion of sediment particles were studied experimentally in a laboratory channel. It was found that for the same hydraulic conditions, deposition gives different numerical results than erosion.
Journal of Hydraulic Research, Vol. 15, No. 2, p. 151-166, 1977.

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 Technical University of Krakow (Poland)
 "Mathematical Model of the River-Bed Erosion Below a Dam "
 The principles of choosing a mathematical model of river-bed erosion were discussed. According to these principles mathematical models were proposed based on the gradually varied flow equation and on (1) Meyer-Peter, (2) Meyer-Peter-Muller, and (3) Gontcharoff Formulas for the bed load.
 Proceedings of the Warsaw Symposium, July 1971: International Association of Hydrological Sciences Publication No. 101, p. 821-830, 1974.
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 Freiburg University, (West Germany), Geographisches Institut.
 "New Method of Computation of the Suspended Sediment Load."
 Until now it was difficult to compute the suspended sediment load. A new method was shown which needs only a small amount of measured data. A sufficiently precise computation of the suspended sediment load was possible by use of an area parameter.
 Proceedings of the Warsaw Symposium, July 1971: International Association of Hydrological Sciences Publication No. 101, p. 659-666, 1974.
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 Technical University of Denmark, Copenhagen, Institute of Hydrodynamics and Hydraulic Engineering.
 "A Sediment Transport Model for Straight Alluvial Channels."
 A simple mathematical model for sediment transport in straight alluvial channels is presented. The model, which is based on physical ideas related to those introduced by Bagnold, was originally developed in two steps, the first describing the bed load transport and the second accounting for the suspended load.
 Nordic Hydrology, Vol. 7, No. 5, p. 293-306, 1976.
- 8B. CHANG, H. H. and HILL, J. C.
 San Diego State University, California Department of Civil Engineering.
 "Computer Modeling of Erodible Flood Channels and Deltas."
 The existing computer program for water-surface computation and delineation of the flood limit was extended to include the effect of channel deformation during a flood.
 Journal of the Hydraulics Division, American Society of Civil Engineers, Vol. 102, No. HY10, Proceedings Paper 12485, p. 1461-1477, October 1976.

- 9B. MAHMOOD, K. and PONCE, V. M.
Colorado State University, Fort Collins, Engineering Research Center.
"Computer Programs for Sediment Transport, Documentation and Listing."
Five Fortran programs for the computation of sediment transport were presented in the form of a reference manual with documentation and listing included.
Available from the National Technical Information Service, Springfield, Virginia 22161.
- 10B. AMAR, A. C. and THOMAS, W. A.
New South Wales University, Kensington (Australia), Faculty of Military Studies.
"Digital Simulation of Aggradation and Degradation in Natural Streams."
The analysis of scour and deposition by modeling the interaction between the water-sediment mixture, sediment material forming the stream's boundary, and the hydraulic characteristics of flow was presented using the hydrologic engineering center's computer program entitled "Scour and Deposition in Rivers and Reservoirs."
Proceedings of the Third Federal Inter-Agency Sedimentation Conference, 1976, Denver, Colorado, March 22-25, 1976. Water Resources Council, Washington, D. C., Sedimentation Committee, p. 4-26, 4-36, 1976.
- 11B. TESAKER, E.
Trondheim University (Norway), Vassdrags-OG Havnelaboratoriet.
"Modelling of Suspension Currents."
The transport and deposition of particles by suspension currents and jets were discussed. The paper described experience with the transfer of results from ideal laboratory studies to practical cases, and discussed the limitations of physical modelling of suspension currents.
Symposium on Modeling Techniques, Volume II, 2nd Annual Symposium of the Waterways, Harbors and Coastal Engineering Division of ASCE (2 Vol.), San Francisco, California, September 3-5, 1975.
- 12B. WANG, H., SALRYMPLE, R. A. and SHIAU, J. C.
Delaware University, Newark, Department of Civil Engineering.
"Computer Simulation of Beach Erosion and Profile Modification Due to Waves."

The phenomenon of beach erosion has become important in recent years as the coastline has become a focus of human activity. In order that adequate planning in the coastal zone be possible, it is necessary to understand and to model the evolving coastline.

Symposium on modeling techniques, Volume II, 2nd Annual Symposium of the Waterways, Harbors and Coastal Engineering Division of ASCE (2 Vol.), San Francisco, California, September 3-5, 1975.

13B. CHESNUTT, C. B.

Coastal Engineering Research Center, Fort Belvoir, Virginia.

"Laboratory Effects in Coastal Movable-Bed Models."

Profile changes were measured during three lengthy experiments in a 6-ft by 3 ft deep by 107-ft long outdoor wave tank, with a piston wave generator at one end and a movable bed of 0.2-mm sand at the other end.

Symposium on Modeling Techniques, Volume II, 2nd Annual Symposium of the Waterways, Harbors and Coastal Engineering Division of ASCE (2 Vol.), San Francisco, California, September 3-5, 1975.

14B. CHRISTENSEN, B. A. and SNYDER, R. M.

Florida University, Gainesville, Department of Civil Engineering.

"Physical Modeling of Scour Initiation and Sediment Transport in Distorted Tidal Models."

While the construction and operation of undistorted fixed bed Froude models of hydraulic structures generally do not present substantial problems, this is not the case when models of entire waterways, estuarine regions, and coastal areas are considered.

Symposium on Modeling Techniques, Volume II, 2nd Annual Symposium of the Waterways, Harbors and Coastal Engineering Division of ASCE (2 Vol.), San Francisco, California, September 3-5, 1975.

15B. PARKER, G and ANDERSON, A. G.

Alberta University, Edmonton, Department of Civil Engineering.

"Modeling of Meandering and Braiding in Rivers."

The results of stability analyses of meander- and braid-like perturbations in straight rivers were used to construct a diagram dividing rivers into straight, meandering, and braided

regimes. The same analysis provided order-of-magnitude estimates of meander and braid longitudinal wavelength and braid number.

Symposium on Modeling Techniques, Volume I, 2nd Annual Symposium of the Waterways, Harbors and Coastal Engineering Division of ASCE (2 Vol.), San Francisco, California, September 3-5, 1975.

16B. FOSTER, J. E.

Army Engineer Waterways Experiment Station, Vicksburg, Mississippi River Regulation Branch.

"Physical Modeling Techniques Used in River Models."

This paper reviewed the basic considerations for determining the type of model needed for a particular study, the selection of scales, the type data to be collected, the accuracy expected, and the various techniques used to simulate prototype occurrences in river models.

Symposium on Modeling Techniques, Volume I, 2nd Annual Symposium of the Waterways, Harbors and Coastal Engineering Division of ASCE (2 Vol.), San Francisco, California, September 3-5, 1975.

17B. DE VRIES, M. and VAN DER ZWAARD, J. J.

Waterloopkundig Laboratorium, Delft (Netherlands).

"Movable-Bed River-Models."

For morphological problems in rivers both physical and mathematical models are used to forecast changes in the river bed due both to natural causes and human interference.

Symposium on Modeling Techniques, Volume I, 2nd Annual Symposium of the Waterways, Harbors and Coastal Engineering Division of ASCE (2 Vol.), San Francisco, California, September 3-5, 1975.

18B. CHEN, Y. H. and SIMONS, D. B.

Colorado State University, Fort Collins, Department of Civil Engineering.

"Mathematical Modeling of Alluvial Channels."

For study of the important aspects of the unsteady flow phenomena in alluvial channels, a mathematical model was utilized to represent the original hydraulic system.

Symposium on Modeling Techniques, Volume I, 2nd Annual Symposium of the Waterways, Harbors and Coastal Engineering Division of ASCE (2 Vol.), San Francisco, California, September 3-5, 1975.

- 19B. MCCAVE, I. N. and SWIFT, S. A.
Oregon State University, Corvallis, School of Oceanography.
"Physical Model for the Rate of Deposition of Fine-Grained Sediments in the Deep Sea."
A model for the net entrapment of fine suspended sediment in the viscous sublayer of a turbulent boundary layer yielded an expression of the same form as one derived previously on an empirical basis.
Geological Society of America Bulletin, Vol. 87, No. 4, p. 541-546, April 1976.
- 20B. MOSHAGEN, H. and TORUM, A.
Norges Tekniske Hoegskole, Trondheim, River and Harbor Lab.
"Wave Induced Pressures in Permeable Seabeds."
Results of a theoretical investigation on the transmission of wave-induced pressures into a permeable sea bottom were reported.
Proceedings of American Society of Civil Engineers, Vol. 101, No. WW1, Proceedings Paper 11099, p. 49-57, February 1975.
- 21B. COLONELL, J. M., FARRELL, S. C. and GOLDSMITH, V.
Massachusetts University, Amherst, Department of Civil Engineering.
"Wave Refraction Analysis: Aid to Interpretation of Coastal Hydraulics."
The relative ease of preparing wave refraction diagrams with digital computer and automatic plotting routines allows their convenient application to a wide variety of engineering and geologic problems of the coastline.
Proceedings of the 21st Annual Hydraulic Division Specialty Conference, Montana State University, Bozeman, August 15-17, 1973.
- 22B. BRIDGE, J. S.
Queens University, Belfast (Northern Ireland), Department of Geology.
"Computer Simulation of Sedimentation in Meandering Streams."
A dynamic mathematical model for simulation of sedimentation in meandering streams was described.
Sedimentology, Vol. 22, No. 1, p. 3-43, February 1975.

23B. IBAD-ZADE, J. A.

Vsesoyuznyi Nauchno-Issledovatel'skii Institut Vodosnabzheniya, Kanalizatsii, Gidrotekhnicheskikh Sooruzhenii I Inzhenernoi Gidrogeologii, Baku (USSR).

"Modelling of Erodible Channels."

A series of problems such as bed formation, velocity distribution, load transport, and sedimentation were solved starting from the energetic concept. The same concept was used as a basis of modeling of erodible channels.

Proceedings of the International Association for Hydraulic Research Symposium on River Mechanics (4 Vol.), Bangkok, Thailand, January 9-12, 1973.

24B. JANSEN, J. M. L. and PAINTER, R. B.

Agricultural University, Wageningen (Netherlands).

"Predicting Sediment Yield From Climate and Topography."

Linear regression models relating annual average sediment yield with a number of climatic and topographic variables were developed for rivers (basin area greater than 5000 sq km) in each of the world's major climatic zones.

Journal of Hydrology, Vol. 21, No. 4, p. 371-380, 1974.

25B. BENNETT, J. P.

Geological Survey, Bay Saint Louis, Mississippi.

"Concepts of Mathematical Modeling of Sediment Yield."

A deterministic structure imitating a sediment yield model should mathematically approximate the behavior of two distinct phases of the phenomenon, the upland phase and the lowland channel phase.

Water Resources Research, Vol. 10, No. 3, p. 485-492, June 1974.

26B. SMITH, T. R.

University of Western Ontario, London, Department of Geography.

"A Derivation of the Hydraulic Geometry of Steady-State Channels from Conservation Principles and Sediment Transport Laws."

It is possible to build an analytical model of channel growth using necessary conditions for the existence of a river channel of finite width, namely, that sediment mass is conserved, that the channel form is sufficient to transport the water, the load of sediment, using reasonable approximations to laws of sediment transport.

Journal of Geology, Vol. 82, No. 1, p. 98-104, January 1974.

27B. MIRTSKHULAVA, TS. E.

"Prediction of the Start of Erosion in the Light of Principles of Reliability Theory." (In Russian)

The method proposed for predicting the start of erosion with the use of the principles of reliability is imperfect, but it led to the construction of a sufficiently simple model for estimating this important stage of erosion.

Dokl Adad S-KH Nauk. 12, p. 39-41, 1972.

28B. MARCOTTE, N., QUACH, T. T., AUBIN, L. and DUSSAULT, J. G.

Division Etudes Spéciales & Recherches, Hydro-Québec, Montréal; le Service Hydraulique, S.E.B.J., Montréal; le Service Hydraulique, Hydro-Québec, Montréal.

"Regime Thermique Des Ecoulements Dans Les Regions Nordiques."

The subject of this communication is the thermal regime of rivers, lakes and reservoirs located north of latitude $53\frac{1}{4}^{\circ}N$.

Proceedings of the Third National Hydrotechnical Conference, Quebec, May 1977, p. 616.

29B. ROBILLARD, P. L.

Département de Génie Civil - Ecole Polytechnique de Montréal, case postale 6079.

"Suppression De La Couverture De Glace Par Un Rejet Thermique."

The thermal discharges from various sources that occur during winter may prevent ice formation at the free surface.

Proceedings of the Third National Hydrotechnical Conference, Quebec, May 1977, p. 362.

30B. CHEE, S. P. and HAGGAG, M. R. I.

University of Windsor, Windsor, Ontario, Department of Civil Engineering.

"Composite Roughness of Channels with an Ice Cover."

A study of the composite roughness of channels with an ice cover was made analytically and with the aid of laboratory experiments.

Proceedings of the Third National Hydrotechnical Conference, Quebec, May 1977, p. 409.

31B. MALCOLM, H. R., JR. and SMALLWOOD, C., JR.

North Carolina State University at Raleigh, Department of Civil Engineering.

"Sediment Prediction in the Eastern United States."

Sediment discharge equations were derived for wooded, rural, urban and severely exposed watersheds on the east coast. Modeling techniques to study some impacts of urbanization on streams and lakes were used.

Journal of the Water Resources Planning and Management Division, American Society of Civil Engineers, Vol. 103, No. WR2.

- 32B. NOVAK, P. and NALLURI, C.
Newcastle-Upon-Tyne University, England.

"Sediment Transport in Smooth Fixed Bed Channels."

Incipient motion of discrete particles resting on a fixed smooth channel bed is investigated in different conveyance shapes. The results are compared with incipient motion studies in conveyances with movable beds.

ASCE Journal of the Hydraulics Division; American Society of Civil Engineers; 345 East 47th Street; New York, New York 10017.

- 33B. ZIMMERMAN, C. and KENNEDY, J. F.
Iowa University.

"Transverse Bed Slopes in Curved Alluvial Streams."

Forty-nine experiments were conducted in three different constant radius, erodible bed, curved flumes using two different sediments to investigate the relationship between channel geometry, flow and sediment properties, and bed topography.

ASCE Journal of the Hydraulics Division; American Society of Civil Engineers; 345 East 47th Street; New York, New York 10017.

- 34B. MIRTSKHULAVA, TS. E.

"Prediction of the Start of Erosion in the Light of Principles of Reliability Theory." (In Russian).

The method proposed for predicting the start of erosion with the use of the principles of reliability is imperfect, but it led to the construction of a sufficiently simple model for estimating this important stage of erosion.

Dokl Adad S-KH Nauk. 12, p. 39-41, 1972.

- 35B. DAS, B. P.
Alberta University, Edmonton, Department of Civil Engineering.

"Bed Scour at End-Dump Channel Constrictions."

The maximum scoured depth is influenced also by the size and density of the bed sediment. The functional relationship was

established and design curves are presented to directly determine the maximum scoured depth.

Journal of the Hydraulics Division, American Society of Civil Engineers, Vol. 99, No. HY12, Paper 10228, p. 2273-2291, December 1973.

- 36B. BRENNER, A. and RIEDEL, P. H.
Queen's University, Kingston (Ontario), Coastal Engineering Research Lab.

"A New Oscillating Water Tunnel."

The system may be used to determine bed shear stress at fixed beds, to study ripple form on a number of sediments with different specific gravities, and for conducting research into the fundamental properties of oscillatory boundary layers.

Journal of Hydraulic Research, Vol. 11, No. 2, p. 107-121, 1973.

- 37B. MANTZ, P. A.
Imperial College of Science and Technology, London (England), Department of Civil Engineering.

"Cohesionless, Fine Graded, Flaked Sediment Transport by Water."

Transport of sediments composed of fine graded flakes was studied using six fine, well-sorted grades of muscovite and biotite mica flakes (specific gravity 2.74). The results contradicts the general supposition that fine graded sediment becomes suspended at a stress magnitude close to that of incipient motion.

Nature Physical Science, Vol. 246, No. 149, P. 14-16, November 5, 1973.

- 38B. ALLEN, J. R. L.
Reading University (England), Sedimentology Research Lab.

"Features of Cross-Stratified Units Due to Random and Other Changes in Bed Forms."

Sedimentology, Vol. 20, No. 2, p. 189-202, May 1973.

- 39B. GALVIN, C. J., JR. and EAGLESON, P. S.

"Experimental Study of Longshore Currents on a Plane Beach."

Measurements were made of the characteristics of breaking waves and the resulting longshore currents for 34 combinations of different waves. Observation and measurement show that most of the fluid in the surf zone stays there, and that longshore current velocity initially increases downstream from an obstacle.

Available from the National Technical Information Service as AD-615 790.

- 40B. MOSLEY, M. P.

Colorado State University, Fort Collins, Department of Geology.

"Longitudinal Ripples Formed by Overland Flow and Tidal Currents."

Longitudinal ripple marks similar in size and appearance to those reported on tidal mudflats developed under the influence of artificial precipitation and overland flow during an experimental study of soil erosion.

Journal of Sedimentary Petrology, Vol. 43, No. 3, p. 795-798, September 1973.

- 41B. WHITEHOUSE, R.

Newcastle-Upon-Tyne University (England), Department of Geography.

"The Wear of Sandstone by Cold, Sliding Ice."

Erosion of rock by sliding ice is a function of friction. Friction increases with load and with decrease in temperature, but decreases with speed of sliding and duration of sliding in laboratory tests.

Polar Geomorphology; Institute of British Geographers Special Publication No. 4, p. 21-31, June 1972.

- 42B. MIKHALEV, M. A.

Politekhnicheskii Institut, Leningrad (USSR).

"Control of Silting in Reservoirs on Mountain Rivers."

Laboratory investigations were conducted to simulate the conditions of scouring and silting in reservoirs and to evolve proposals for flushing out mud to restore available storage.

Hydraulic Research and Its Impact on the Environment, Proceedings of 14th Congress of International Association for Hydraulic Research, Paris, August 29-September 3, 1971.

- 43B. RIPKEN, J. F. and WETZEL, J. M.
Minnesota University, Minneapolis, St. Anthony Falls Hydraulic Lab.

"A Study of the Fragmentation with Water and Solid Impactors."

Tests were made to see if water slugs of substantial size (up to 1/2 lb) traveling at moderate velocities (800 fps) could impinge on rock with fragmenting pressure.

Available from National Technical Service, Springfield, Virginia 22161.

- 44B. OWEN, M. W. and ODD, N. V. M.
Hydraulics Research Station, Wallingford (England).

"A Mathematical Model of the Effect of a Tidal Barrier on Siltation in an Estuary."

A mathematical model of silt movement in the Thames estuary, England, was used to reproduce the periodic pattern of suspended silt concentrations and the location of the main areas of deposition of silt in the estuary to test the effects of silt movement in the estuary of various tidal barriers proposed for flood protection.

Tidal Power, Proceedings of International Conference, May 24-29, 1970, Nova Scotia Technical College, Halifax: New York, New York, Plenum Press, p. 457-485, 1972.

- 45B. PIRKOVSKY, M.
Slovenska Adademie Vied, Bratislava (Czechoslovakia), Ustav Hydrologie a Hydrauliky.

"Deformation of Alluvial Beds as a Consequence of the Discontinuance of Strong Flows (Deformation D'un Lit Alluvial en Consequence D'une Discontinuite des Debits Solides)."

The river bed and the water level course can be directly computed. The considerations are based on experimental research results.

Proceedings of 14th Congress of International Association for Hydraulic Research, Paris, August 29-September 3, 1971.

- 46B. SMITH, T. R. and BRETHERTON, F. P.
University of Western Ontario, London, Department of Geography.

"Stability and the Conservation of Mass in Drainage Basin Evolution."

Drainage basin evolution is modeled as the time development of an initial surface subject to conservation of sediment and

water and a transport law $QS = F(S, Q)$ connecting the sediment flux QS with the local slope S and the discharge of surface water Q .

Water Resources Research, Vol. 8, No. 6, p. 1506-1529, December 1972.

47B. POPOVA, N. S.

"A Study of Erosion Resistance of Soils on the Northern Slopes of Trans-Ili Ala-Tau and the Ketmen Range." (In Russian).

A study of the texture, microaggregate composition, plasticity and moisture equivalent of different types of soils resulted in derivation of the basic erosion indexes, i.e., the aggregation, dispersion and erosion indexes, the physico-chemical properties.

Tr Inst Pochvoved Akad Nauk Kas SSR. 19, p. 198-242, 1970.

48B. CARSTENS, M. R. and ALTINBILEK, H. D.

Georgia Institute of Technology, Atlanta, School of Civil Engineering.

"Bed-Material Transport and Bed Forms."

Close agreement of the limits of the three regions from the three independent analyses confirms the hypothesis that bed-material transport should be classified by bed-form geometry rather than as suspended load and bed load.

Journal of the Hydraulics Division, American Society of Civil Engineers, Vol. 98, No. HY5, Paper 8890, p. 787-794, May 1972.

49B. TELEKI, P. G. and ANDERSON, M. W.

Louisiana State University, Baton Rouge, Department of Geology, and Army Coastal Engineering Research Center.

"Bottom Boundary Shear Stresses on a Model Beach."

The maximum amplitude of shear stress in the bottom boundary layer of water waves was evaluated with a Preston probe. Near-bottom velocity profiles were obtained in laminar and developing turbulent flow conditions.

Proceedings of the Twelfth Coastal Engineering Conference, September 13-18, 1970, Washington D. C.

50B. ENGELUND, F. and FREDSOE, J.

Technical University of Denmark, Copenhagen, Hydraulic Lab.

"Three-Dimensional Stability Analysis of Open Channel Flow Over a Erodible Bed."

The formation of ripples and dunes (lower range bed waves) is related to the transport of sediment as bed load.

Nordic Hydrology, Vol. 2, No. 2, p. 93-108, 1971

51B. FLEMING, G.

Strathclyde University, Glasgow, Scotland.

"The Stanford Sediment Model I: Translation."

A sediment transport model for digital computer and a program translated into 1900 algol, a programming system used in Europe, are described.

Bull. Int. Ass. Sci. Hydrol., Vol. 13, No. 2, pp. 108-125, June 1968.

52B. SOUTHARD, J. B., YOUNG, R. A. and HOLLISTER, C. D.

Massachusetts Institute of Technology, Cambridge, Department of Earth and Planetary Sciences.

"Experimental Erosion of Calcareous Ooze."

Flume experiments on the erosion of abyssal calcareous ooze in shallow uniform flows of sea water show that erosion velocities range from 7-10 cm/sec soon after rapid deposition of the bed to 15-20 cm/sec after a few tens of hours.

Journal of Geophysical Research, Vol. 76, No. 24, p. 5903-5909, August 20, 1971.

53B. SOUTHARD, J. B. and DINGLER, J. R.

Massachusetts Institute of Technology, Cambridge, Department of Earth and Planetary Sciences; and Scripps Institute.

"Flume Study of Ripple Propagation Behind Mounds on Flat Sand Beds."

Propagation of sediment ripples behind mounds of sediment in uniform flows of water over flat beds of fine sand was studied in a recirculating open channel.

Sedimentology, Vol. 16, No. 3-4, p. 251-263, June 1971.

54B. SHEMDIN, O. H.

Florida University, Gainesville, Department of Coastal and Oceanographic Engineering.

"River-Coast Interaction: Laboratory Simulation."

The flow of a river into the ocean is often obstructed by a sand bar at the river mouth. The interaction of a river with the coast can be simulated in a hydraulic model with a movable bed.

ASCE Proceedings, Journal of the Waterways, Harbors and Coastal Engineering Division, Vol. 96, No. WW 4, p. 755-766, November 1970.

55B. PAINTAL, A. S.

West Virginia Institute of Technology, Montgomery, Department of Civil Engineering.

"Concept of Critical Shear Stress in Loose Boundary Open Channels."

The problem of defining critical flow condition associated with the initial instability of bed material particles was reviewed in relation to existing concepts.

Text in English and French, Journal of Hydraulic Research, Vol. 9, No. 1, p. 91-113, 1971.

56B. KARAKI, S. S., GRAY, E. E. and COLLINS, J.

"Dual Channel Stream Monitor."

Am. Soc. Civil Engineers Proc., Vol. 87, No. HY6, p. 1-16, 1961.

57B. LEE, B. K.

"Laboratory Study of an Alluvial Stream at One-Foot Depth."

M.S. Thesis, Colorado State University, Fort Collins, Civil Engineering Department, 57 p., 1969.

58B. LEE, B. K.

"Stochastic Analysis of Particle Movement Over a Dune Bed."

Ph.D. Dissertation, Colorado State University, Fort Collins, 220 p., 1973.

59B. SAYRE, W. W. and CONOVER, W. J.

"General Two-Dimensional Stochastic Model for the Transport and Dispersion of Bed-Material Sediment Particles."

International Association Hydraulic Research, 12th Congress, Fort Collins, Colorado, Proceedings, Vol. 2, p. 33-95, 1967.

60B. SHEN, H. W. and TODOROVIC, P. N.

"A General Stochastic Model for the Transport of Sediment Bed Material."

1st International Symposium on Stochastic Hydraulics, ed. Chao-Lin Chiu, Proceedings, Pittsburgh, Pennsylvania, 1. 426-448, 1971.

61B. TSANG, G.

"Conceptual Design of a Multi-Purpose Instrument for Winter Stream Metering."

Proceedings of International Symposium on Advanced Concepts and Techniques in the Study of Snow and Ice Resources, Monterey, December, 1973. Published by the U.S. National Academy of Sciences, p. 688-698, 1974.

62B. BLINCO, P. H., MAHMOOD, K. and SIMONS, D. B.

"Stochastic Structure of the Turbulent Boundary Shear Stress Process."

Proceedings of the XVth IAHR Congress, Istanbul, Turkey, 1973.

63B. Cunge, J. A. and SIMONS, D. B.

"Mathematical Model of Unsteady Flow in Movable Bed Rivers with Alluvial Channel Resistance."

Paper presented at the XVIth IAHR Congress, Sao Paulo, Brazil, July-August, 1975.

64B. CHEN, Y. H. and SIMONS, D. B.

"Mathematical Modeling of Alluvial Channels, Session 7: Mathematical River Models."

Proceedings Issue, Vol. 1, Modeling Techniques, Symposium on Modeling Techniques, San Francisco, California, September, 1975.

65B. SIMONS, D. B., LI, R. M. and WARD, T. J.

"Modeling of Sediment and Water Routing and Yield at Colorado State University."

Presented at the USDA Forest Service, Earth Science Symposium, Fresno, California, November, 1976.

- 66B. SIMONS, D. B., RICHARDSON, E. V. and NORDIN, C. F., JR.
"Bedload Equation for Ripples and Dunes."
Published as USGS Professional Paper 462-H, CER64DBS-EVR-CFN30, 1964.
- 67B. SIMONS, D. B., ALBERTSON, M. L. and RICHARDSON, E. V.
"Dimensional Analysis of Flow in Alluvial Channels."
Civil Engineering Department, Colorado State University, 1958.
- 68B. RICHARDSON, E. V., SIMONS, D. B. and POSAKONY, G. J.
"Sonic Depth Sounder for Laboratory and Field Use."
USGS Circular No. 450, CER60EVR11, 1961.
- 69B. CHESNUTT, C. B., ET AL.
"Beach Profile Development on an Initial 1:10 Slope of 0.2 Millimeter Sand."
Transactions of the American Geophysical Union, Vol. 53, p. 411, 1972.
- 70B. COLLINS, J. I. and CHESNUTT, C. B.
"Tests on the Equilibrium Profiles of Model Beaches and the Effects of Grain Shape and Size Distribution."
Proceedings of the Symposium on Modeling Techniques, p. 907-926, 1975.
- 71B. COLLINS, J. I. and CHESNUTT, C. B.
"Grain Shape and Size Distribution Effects in Coastal Models."
TP 76-II, U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., July, 1976.
- 72B. FAIRCHILD, J. C.
"Laboratory Tests of Longshore Transport."
Proceedings of the 12th Conference on Coastal Engineering, p. 867-889, 1970a.

- 73B. FAIRCHILD, J. C.
"Wave Diffraction in a Laboratory Movable-Bed Setup."
Bulletin and Summary of Research Progress Fiscal Years 1967-69, Vol. III, U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Washington, D. C., 1970b.
- 74B. GALVIN, C. J.
"Finite-Amplitude, Shallow-Water Waves of Periodically Recurring Form."
Proceedings of the Symposium on Long Waves, p. 1-32, 1972.
- 75B. HULSBERGEN, C. H.
"Origin, Effect, and Suppression of Secondary Waves."
Proceedings of the 14th Conference on Coastal Engineering, p. 392-411, 1974.
- 76B. MADSEN, O. S.
"A Three Dimensional Wave Maker, Its Theory and Applications."
Journal of Hydraulic Research, Vol. 12, No. 2, p. 205-222, 1974.
- 77B. MADSEN, O. S. and MEI, C. C.
"Dispersive Long Waves of Finite Amplitude over an Uneven Bottom."
Report No. 117, Massachusetts Institute of Technology, Hydrodynamics Laboratory, Cambridge, Mass., 1969.
- 78B. SAVAGE, R. P.
"Laboratory Study of the Effect of Groins on the Rate of Littoral Transport: Equipment Development and Initial Tests."
TM-114, U.S. Army, Corps of Engineers, Beach Erosion Board, Washington, D. C., June, 1959.
- 79B. SAVAGE, R. P.
"Laboratory Determination of Littoral-Transport Rates."
Journal of the Waterways and Harbors Division, Vol. 88, No. WW2, May, p. 69-92, 1962.

- 80B. WATTS, G. M. and DEARDUFF, R. F.
"Laboratory Study of Effect of Tidal Action on Wave-Formed Beach Profiles."
TM-52, U.S. Army, Corps of Engineers, Beach Erosion Board, Washington, D. C., December, 1954.
- 81B. BARNARD, B. J. S. and PRITCHARD, W. G.
"Cross-Waves, Part 2, Experiments."
Journal of Fluid Mechanics, Vol. 55, pt. 2, p. 245-255, 1972.
- 82B. CHESNUTT, C. B.
"Laboratory Effects in Coastal Movable-Bed Models."
Proceedings of the Symposium on Modeling Techniques, p. 945-961, 1975.
- 83B. CHESNUTT, C. B. and GALVIN, C. J., JR.
"Lab Profile and Reflection Changes for $H_o/L_o = 0.02$."
Proceedings of the 14th Conference on Coastal Engineering, p. 958-977, 1974.
- 84B. CHESNUTT, C. B. and STAFFORD, R. P.
"Movable-Bed Experiments with $H_o/L_o = 0.021$ (1970)."
Vol. II, MR 77-7, Laboratory Effects in Beach Studies, U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., August, 1977a.
- 85B. CHESNUTT, C. B. and STAFFORD, R. P.
"Movable-Bed Experiments with $H_o/L_o = 0.021$ (1971)."
Vol. III, MR 77-7, Laboratory Effects in Beach Studies, U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., November, 1977b.
- 86B. CHESNUTT, C. B. and STAFFORD, R. P.
"Movable-Bed Experiments with $H_o/L_o = 0.021$ (1972)."
Vol. IV, MR 77-7, Laboratory Effects in Beach Studies, U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., December, 1977c.

- 87B. CHESNUTT, C. B. and STAFFORD, R. P.
"Movable-Bed Experiments with $H_o/L_o = 0.039$."
Vol. V, MR 77-7, Laboratory Effects in Beach Studies, U. S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., December, 1977d.
- 88B. CHESNUTT, C. B. and STAFFORD, R. P.
"Movable-Bed Experiments with $H_o/L_o = 0.004$."
Vol. VI, MR 77-7, Laboratory Effects in Beach Studies, U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., March, 1978a.
- 89B. CHESNUTT, C. B. and STAFFORD, R. P.
"Movable-Bed Experiments with $H_o/L_o = 0.013$."
Vol. VII, MR 77-7, Laboratory Effects in Beach Studies, U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., March, 1978b.
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"Procedures Used in 10 Movable-Bed Experiments."
Vol. I, MR 77-7, Laboratory Effects in Beach Studies, U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., June, 1977.
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"A Schematization of Onshore-Offshore Transport."
Proceedings of the 14th Conference on Coastal Engineering, p. 884-900, 1974.
- 92B. WATTS, G. M.
"Laboratory Study of the Effect of Varying Wave Periods on Beach Profiles."
TM-53, U.S. Army, Corps of Engineers, Beach Erosion Board, Washington, D. C., September, 1954.
- 93B. KAPLAR, C. W.
"Experiments to Simplify Frost Susceptibility Testing of Soils."
USA CRREL Technical Report 223, 21 p., 1971.

- 94B. HIRAYAMA, K., SCHWARTZ, J. and WU, H.
"Model Technique for the Investigation of Ice Forces on Structures."
Second International Conference of Port and Ocean Engineering Under Arctic Conditions, Reykjavik, 1973.
- 95B. TSANG, G.
"Development and Evaluation of an Experimental Frazil Ice Measurement Instrument."
Scientific Series, Inland Waters Directorate, Department of Environment (in press).
- 96B. AHMAD, M.
"Experiments on Design and Behavior of Spur Dikes."
Proceedings, Minnesota International Hydraulics Convention, 1-4 September, p. 145-159, 1953.
- 97B. THOMSEN, A. L., WOHLT, P. E. and HARRISON, A. S.
"Riprap Stability on Earth Embankments Tested in Large- and Small-Scale Wave Tanks."
Technical Memorandum No. 37, June, U.S. Army Coastal Engineering Research Center, CE, Washington, D. C., and U.S. Army Engineer Division, Missouri River, Omaha, Nebraska, 1972.
- 98B. ACRES AMERICAN INCORPORATED.
"Model Study of the Little Rapid Cut Area of the St. Marys River, Michigan."
Prepared under Contract No. DACW 35-75-C-0014, U.S. Army Corps of Engineers, Detroit District, Buffalo, 1975.
- 99B. CROASDALE, K. R., MORGENSTERN, N. R. and NUTTALL, J. B.
"Indentation Tests to Investigate Ice Pressures on Vertical Piers."
Symposium on Applied Glaciology Cambridge, (to be published in Journal of Glaciology), 1976.
- 100B. CHEN, Y. H.
"Mathematical Modeling of Water and Sediment Routing in Natural Channels."
Ph.D. Dissertation, Department of Civil Engineering, Colorado State University, Fort Collins, Colorado, March, 252 p., 1973.

- 101B. STEVENS, M. A., SIMONS, D. B. and CHEN Y. H.
"Hydraulic Model Study River Bend Station - Units 1 and 2, Bulf States Utilities Company."
Civil Engineering Department, Report No. CER73-74MAS-DBS-YHC25, Colorado State University, Fort Collins, Colorado, March, 156 p., 1974.
- 102B. CHEN, Y. H. and SIMONS, D. B.
"Routing of Water and Sediment in Canals and Rivers."
Proceedings, Contribution of Irrigation and Drainage to the World Food Supply Specialty Conference, ASCE, Biloxi, Mississippi, August 13-15, p. 121-146, 1974.
- 103B. STEVENS, M. A., CHEN, Y. H. and SIMONS, D. B.
"River Bank Recessions for Power Plant Facilities."
Proceedings, Symposium on Modeling Techniques for Waterways, Harbors and Coastal Engineering, ASCE, Vol. 1, San Francisco, California, September 3-5, p. 560-574, 1975.
- 104B. CHEN, Y. H. and SIMONS, D. B.
"Mathematical Modeling of Alluvial Channels."
Proceedings, Symposium on Modeling Techniques for Waterways, Harbors and Coastal Engineering, ASCE, San Francisco, California, September 3-5, p. 466-483, 1975.
- 105B. CHEN, Y. H. and YEVJEVICH, V.
"A Mathematical Model of Hydraulic Transient Phenomena in Storage and Drainage Tunnels."
Proceedings, International Symposium on Urban Hydrology, Hydraulics and Seciment Control, University of Kentucky, Lexington, Kentucky, July 18-21, 1977.
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"Water and Sediment Routing in Rivers."
Chapter 10, Institute on River Mechanics - Modeling of Rivers, Edited by H. W. Shen, Colorado State University, Fort Collins, Colorado, July 5-15, 1977.
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"Mathematical Model of Sedimentation in Reservoirs."
Submitted to the Hydraulics Division, ASCE, for possible publication.

- 108B. CHEN, Y. H., SIMONS, D. B. and OWENS, E.
"A Compound-Stream Flow Model for Sediment Routing in Large Rivers."
Submitted to the Waterways, Port, Coastal and Ocean Division, ASCE, for possible publication.
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"Laboratory Investigation of Ice Pressure."
USBR, Structural Research Laboratory, Report SP-31, 1951.
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"Stochastic Model for Sand Dispersion."
J. Hydraulics Div., ASCE 97, 265 p., 1971.
- 111B. DOOGE, J. C. I. and HARLEY, B. M.
"Linear Routing in Uniform Open Channels."
Proc. Int. Hydrology Symp., Fort Collins, Colorado, Vol. I, p. 57-63, 1967.
- 112B. GRIJSEN, J. G. and OGINK, H. J. M.
"Mathematical Models for Run-Off by Surface and Open Channels."
Delft Hydraulics Laboratory, Research Report S134-II, (in Dutch), 1974.

C. G E N E R A L

1C. WATER RESOURCES COUNCIL.

Washington, D. C. Sedimentation Committee.

"Notes on Sedimentation Activities, Calendar Year 1974."

Information is presented which was furnished by Federal agencies conducting sedimentation investigations on (1) work in progress or planned, (2) important findings, on new methods, (3) new publications and (4) laboratory and other research activities.

Available from the National Technical Information Service, Springfield, Virginia 22161.

2C. DURHAM, R. W. and GOBLE, R. J.

Canada Centre for Inland Waters, Burlington (Ontario).

"A Radiotracer Technique for Measuring Sediment Movement."

A technique for measuring the direction of movement of sand sediments by means of a radiotracer is described.

Scientific Series No. 80, 1977.

3C. AMERICAN GEOPHYSICAL UNION, Washington, D. C.

"Research Needs in Erosion and Sedimentation."

Erosion and sedimentation are important problems in environmental and water quality studies, watershed management, river mechanics and training, reservoir planning, and dredging in waterways and harbors. The importance of these problems is being magnified by the increasing demands for energy and foods, which in turn require an increased water supply.

EOS, Vol. 58, No. 12, p. 1076-1083, December 1977.

4C. WIRASINHA, L. G.

"Prevention of Sand Bar Formation at Outlets into the Sea or Other Bodies of Water."

An apparatus and method carried out for preventing formation of sand bars from sand or silt at the outlet of a body of water emptying from inland into another body of water such as a lake or the sea.

Official Gazette of the United States Patent Office, Vol. 958, No. 3, p. 964, May 17, 1977.

5C. BUSBY, C. E.

"American Sedimentation Law and Physical Processes."

The process of sedimentation includes weathering, erosion, transportation, deposition and consolidation and often involves legal problems. Of great significance is the issue of who controls the right to sediments suspended in flowing waters.

Chapter VII, ASCE Manuals and Reports on Engineering Practice--No. 54, Sedimentation Engineering, 1975, p. 629-74.

6C. WOLMAN, M. G.

Geological Survey, Baltimore, Maryland, Water Resources Division.

"Changing Needs and Opportunities in the Sediment Field."

Information on the processes of erosion and sedimentation, while sometimes sufficient for gross estimates of yield, remains inadequate for modern environmental management.

Water Resources Research, Vol. 13, No. 1, p. 50-54, February 1977.

7C. WATER RESOURCES COUNCIL.

Washington, D. C. Sedimentation Committee.

"Proceedings of the Third Federal Inter-Agency Sedimentation Conference 1976."

In the 13 years since the last conference, there has been a large amount of research and development work. The work group recommended that a third conference be held in March 1976.

Available from the National Technical Information Service, Springfield, Virginia 22161.

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Maryland Department of Natural Resources, Annapolis, Water Resources Administration.

"Sediment and Erosion Control Design Criteria."

In an effort to control erosion and sediment caused by human activity, the Maryland legislature adopted, in 1970, a state-wide sediment control law.

The APWA Reporter, Vol. 42, No. 5, May 1975.

9C. LARSEN, O. J. F.

"Device for Producing and Protecting Deposits of Sedimentary Material on the Floor of Bodies of Water."

A device is described for deposition and protecting sand and other littoral drift material on the floors of seas, lakes,

— rivers and other bodies of water where the bed and sides consist of erosionable material.

— Official Gazette of the United States Patent Office, Vol. 927, No. 5, p. 1838, October 29, 1974.

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— Geological Survey, Tacoma, Washington.

— "Ice Sheets and Glaciers."

— Ice sheets and glaciers are briefly discussed.

— Encyclopaedia Britannica, 15th Edition, p. 175-186, 1974.

— 11C. ANDERSON, F. E.

— New Hampshire University, Durham, Department of Earth Sciences, and Jackson Estuarine Lab.

— "The Effect of Boat Waves on the Sedimentary Processes of a New England Tidal Flat."

— The effect of increased boat traffic on channel bank and tidal flat erosion was studied using a system of intake valves in a portion of a tidal flat in the great bay estuary of New Hampshire.

— Available from National Technical Information Service, Springfield, Virginia 22161.

— 12C. REIMNITZ, E., RODEICK, C. A. and WOLF, S. C.

— Geological Survey, Menlo Park, California.

— "Strudel Scour: A Unique Arctic Marine Geologic Phenomenon."

— When northward-flowing rivers of Alaska inundate extensive areas of sea ice during spring breakup, drainage of freshwater through the ice at holes and cracks (strudel) causes scour depressions more than 4 m deep and as much as 20 m or more across in the sea floor below.

— Journal of Sedimentary Petrology, Vol. 44, No. 2, p. 409-420, June 1974.

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— Westinghouse Electric Corp., Pittsburgh, Pennsylvania.

— "Geological Investigations."

— The Chester River, Maryland, is similar to many rivers entering Chesapeake Bay in that extensive portions of its lower reaches are now drowned by the geologically recent rise in sea level.

— Chester River Study, Volume II, Joint Investigation by State of Maryland Department of Natural Resources and Westinghouse Electric Corporation, p. 75-137, November 1972.

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 Technische Hochschule, Vienna (Austria), Institut Fuer Geophysik.
 "Hydrogeomorphology."
 The current state of knowledge of the mechanical effects caused by water on the morphology of the earth is reviewed.
 Journal of Hydrology, Vol. 20, No. 3, p. 193-215, November 1973.
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 Rijkswaterstaat-Deltadienst, The Hague (Netherlands), Coastal Research Department.
 "Some Characteristics of the Dutch Coast."
 Sediment transport along the Dutch coast is discussed in some detail. Consideration is given to the effect of waves and tidal currents on a non-disturbed coast.
 Proceedings of 8th Conference on Coastal Engineering, Mexico City, November 1962, American Society of Civil Engineers, Part 4, Chap. 41, p. 756-764, 1963.
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 Tokyo University, (Japan), Department of Civil Engineering.
 "Rhythmic Pattern of Longshore Bars Related to Sediment Characteristics."
 The origin and movement are discussed of nearshore and underwater sand bars which are seen on aerial photographs taken on the coast of Japan.
 Proceedings of 8th Conference on Coastal Engineering, Mexico City, November 1962, American Society of Civil Engineers, Part 2, Chap. 16, p. 248-278, 1963.
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 "Some Data on the Post-Glacial Transgression of the Bering Sea."
 Findings are compared with data on recent past - glacial transgression of the Black Sea.
 Dynamics and Morphology of Sea Coasts, TT 68-50355, p. 124-131, 1969.
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 "Recent Development of the Temryuk Coast on the Azov Sea."
 Investigations covered the nearshore zone in the south of Temryuk Bay from Cape Akhilleon in the west to Verbyanaya Spit in the east. In plan, this area is a shallow concave arc complicated

by the wave-cut Akhilleon-Pekly prominence on the one side and by the protruding delta of the Kuban River on the other side.

Dynamics and Morphology of Sea Coasts, TT 68-50335, p. 111-123, 1969.

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"Some Data on the Post-Glacial Evolution of Karkinit Bay and the Accumulation of Bottom Sediment Within It."

Karkinit Bay is the largest in the Black Sea. The bay outlines are very unusual. The abundance of sandy material gave rise to large accumulation coastal forms, causing heavy articulation of the coastline.

Dynamics and Morphology of Sea Coasts, TT 68-50355, p. 92-110, 1969.

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Geological Survey of Canada, Ottawa (Ontario).

"Some Effects of Surface Disturbance on the Permafrost Active Layer at Inuvik, N.W.T., Canada."

In permafrost active layer in the forest-tundra environment of northern Canada, the effects of disturbance of the ground surface on the active layer were studied.

International Conference on Permafrost 2nd Yakutsk, USSR 1973, p. 649-657, 1973.

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Cold Regions Research and Engineering Lab., Hanover, New Hampshire.

"Environmental Considerations for the Utilization of Permafrost Terrain."

Current utilization of the permafrost landscape is still relatively low as a result of its vastness, remoteness and inaccessibility, and low population usages.

International Conference on Permafrost 2nd, Yakutsk, USSR 1973, p. 587-590, 1973.

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Geological Sruvey, Albuquerque, New Mexico.

"Formation of Joints in Bedrock by Moving Glacial Ice."

This report investigates the hypothesis that glaciation may open joints in bedrock, the orientation of joints in igneous

and sedimentary rocks was measured at 21 localities in California, Maine, and New York.

Journal of Research of the U. S. Geological Survey, Vol. 1, No. 2, p. 229-235, March-April 1973.

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Geological Survey, Washington, D. C.

"Fluvial-Sediment Discharge to the Oceans from the Conterminous United States."

Annual fluvial-sediment discharge from the conterminous United States averages 491,449,600 short tons, of which 14,204,000 is discharged to the Atlantic Ocean, 378,179,000 to the Gulf of Mexico, and 99,066,600 to the Pacific Ocean.

Available free on Application to USGS, Washington, D. C. 20242, Geological Survey Circular 670, 1973.

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Battelle-Pacific Northwest Labs., Richland, Washington.

"Methods for the Characterization of Suspended Sediment and Selected Applications for the Acquired Data."

Analytical methods required to develop predictive models of sediment and sorbed pollutant transport include isolation of suspended sediment from water, determination of quantity of suspended sediment, determination of particle size distributions and separation into particle size fractions, mineralogical analyses, and characterization of surface chemistry.

Report BNWL SA-4385 (1972).

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"Methods of Relief Studies for Evaluation of the Potential Danger of Water Erosion of Soils." (In Russian).

Soil erosion studies demand quantitative relief parameters, including the dissection by gullies and ravines, depths of the major local base levels of erosion, average surface gradients and average length of slopes.

Izv Kuibyshev S-KH Inst. Vol. 26, No. 2, p. 172-179, 1970.

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Nottingham University (England), Department of Geography.

"Feedback Relationship in Geomorphology."

In fluvial processes negative feedback is dominant, and leads to the development of longitudinal river profiles. In glacial

erosional processes positive feedback is dominant and leads to increased irregularity in the longitudinal profile of glaciated valleys. In beach processes negative feedback is common in very short-term changes.

Geografiska Annaler, Vol. 52A, No. 3-4, p. 147-159, 1970.

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Louisiana State University, Baton Rouge, Coastal Studies Institute.

"Transport Velocities of Individual Size Fractions in Heterogeneous Bed Load."

In order to evaluate the importance of differential transport velocities as a factor in sediment sorting by size and shape, transport velocities of individual size fractions in heterogeneous size mixtures of spherical glass beads and natural material were determined for different transport rates.

Geografiska Annaler, Vol. 51A, No. 3, p. 127-144, 1969.

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North Carolina University, Chapel Hill, Department of Geology.

"Deep Erosion by Continental Ice Sheets."

Erosion by continental ice sheets removed sedimentary cover to exhume some of the world's largest areas of exposed pre-cambrian crystalline rock.

Geological Society of America Bulletin, Vol. 83, No. 4, p. 1037-1056, April 1972.

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Akademiya Nauk SSSR, Moscow, Institut Geologii I Razrabotki Goryuchikh Iskopayemykh.

"Analysis of Total Weight of Holocene Deposits in the Sea of Azov (Analiz Absolyutnykh Mass Golotsenovykh Otlozheniy Azovskogo Morya)."

Holocene deposits in mid-sea areas of the sea of azov bounded by the 10-m isobath were investigated for total thickness of bottom sediments and their specific weights.

Akademiya Nauk SSSR Doklady, Vol. 198, No. 3, p. 653-656, 1971.

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"Sediment Control Methods: B. Stream Channels."

General knowledge of control of erodible stream channels based on experience is summarized.

Journal of the Hydraulics Division, American Society of Civil Engineers, Vol. 98, No. HY7, Paper 9071, p. 1295-1326, July 1972.

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Geografisk Institut, Aarhus (Denmark).

"Some Notes on Chalk Erosion in Denmark."

The chalk beds in Denmark are largely covered by quaternary deposits. The consequent practical problems for geomorphological, hydrological and chemical work are discussed.

Cave Research Group of Great Britain Transactions, Vol. 14, No. 2, p. 52-53, March 1972.

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Alaska University, College.

"Sedimentological and Geochemical Aspects of Sediment and Water From Ten Alaskan Valley Glaciers."

The characteristics of superglacial sediments, suspended stream sediments, and meltwater from ten Alaskan valley glaciers were determined.

Available from the National Technical Information Service as PB-206, 153.

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Tetra Tech, Inc., Pasadena, California.

"A Comparison of Fluvial and Coastal Similitude."

The conditions of similitude for movable bed scale models of rivers and estuaries are compared with those of beaches and shorelines.

Proceedings of the Twelfth Coastal Engineering Conference, September 13-18, 1970.

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Trinity College, Dublin (Ireland), Department of Geography.

"The Geomorphic Effects of Groundwater."

The geomorphic effects of groundwater, considered as water of meteoric origin within the soil and underlying rocks is discussed. Its distribution is widespread, but since its geomorphic effects operate primarily through solution, its influence is most striking in carbonate terrains.

Introduction to Fluvial Processes, Methuen, London, p. 108-123, 1971.

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French Central Hydraulic Lab.

"A Study of the Physical Properties of Various Forms of Very Fine Sediments and Their Behavior Under Hydrodynamic Action (French)."

Some basic physical properties of very fine sediment samples collected from various localities in France and abroad were investigated at the French Central Hydraulic Laboratory for evaluation of the dynamics of the sediments.

La Houille Blanche (Rev. of French Hydrotech Soc.), No. 7, pp. 591-620, 1968.

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"Role of Silt in Water Pollution."

The amount of silt reaching a reservoir or treatment plant can be reduced by soil conservation practices within the watershed.

American Water Works Association Journal, Vol. 58, No. 11, pp. 1483-1488, November 1966.

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Canada Department of Energy, Mines and Resources, Ottawa, Canada.

"Fluvial Processes in the High Arctic."

The runoff characteristics of the Meham River near Resolute, Cornwallis Island, are considered in relation to a general discussion of some aspects of fluvial processes in high arctic regions, in view of the fact that the erosional role of high melting snow in these regions has been generally underestimated.

Geog. Bull., Vol. 9, No. 3, pp. 262-268, 1967.

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"Erosion of Cohesive Sediments."

Described is the relationship of cohesive sediments to problems associated with agricultural land and channel improvements, design criteria, and laboratory and field research.

ASCE Proc., J. of Hydraul. Div., Vol. 94, No. HY4, Paper 6044, pp. 1017-1049, July 1968.

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Cambridge University (England), Department of Geography.

"World Erosion and Sedimentation."

The magnitudes and areal variations of both erosion and sedimentation on a world scale are reviewed. Gross rates of denudation of the land surface are given by measuring the sediment load of rivers at their mouths.

Introduction to Fluvial Processes, Methuen, London, p. 8-29, 1971.

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The subjects discussed include: world erosion and sedimentation; the drainage basin as the fundamental geomorphic unit; the role of water in rock-disintegration; soil moisture; infiltration, throughflow, and overland flow; erosion by water on hillslopes; the geomorphic effects of groundwater; open channel flow and other related matter.

Methuen, London, 1971, 218 p.

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Polish Academy of Sciences, Krakow, Zaklad Biologii Wod.

"Variability of the Chemical Composition of Water in Ponds of Various Disposition of the Bottom in Relation of the Local Level of Erosion." (In Polish).

Investigations were made on the water of ponds of various bottom dispositions in relation to the local level of the surface-water flow and ground-water table of the surrounding terrain.

Acta Hydrobiol. 10(4): 525-532, Illus., 1968.

42C. "Hydraulics and Hydraulic Engineering (Russian: Gidravlika I Gidrotekhnika)."

This collection of 18 papers includes articles concerned with study of turbulence, cavitation, unsteady and turbulent flow in open channels, movement of fluid with variable discharge and measurement of discharges in pipe lines.

No. 10, Kiev, 1970, 112 p.

43C. GRIGOR'YEVA, O. G.

"Justification Check of a Method for Calculating Reservoir-Bank Transformation, as Workd Out at the State Hydrological Institute, Against Field-Observation Data (Russian: Proverka Opravdyvayemosti Metoda Rascheta Pereformirovaniya Beregov Vodokhranilishch, Razrabotannogo V GGI, Po Materialam Naturnykh Nablyudeniy)."

The dimensions of three large reservoirs in the European USSR are given and the nature of their banks briefly described. In

all cases the period of bank erosion observations was far below the minimum forecast period of record of 12.5 years stipulated by the Shi method.

Hydraulic and Morphological Studies of Rivers and Water Bodies (Gidravliko-Morfologicheskiye Issledovaniya Rek I Vodoyemov), Gosudarstvennyy Ordena Trudovogo Krasnogo Znameni Gidrologicheskiy Institut Trudy, No. 169; Gidrometeoizdat, Leningrad, p. 101-122, 1969.

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Nature Conservancy, Wareham (England), Furzebrook Research Station.

"Significance of Pebble Size and Shape in Sorting by Waves."

Since the specific gravity of both lithological types is the same it would appear that over the range of pebble sizes and shapes on this beach, thickness is the critical dimension in determining the overall sorting of pebbles by wave action.

Sedimentary Geology, Vol. 4, No. 2. p. 89-101, June 1970.

- 45C. Bureau of Reclamation, Washington, D. C.

"Notes on Sedimentation Activities, Calendar Year 1969."

This report is a digest of information furnished by all Federal agencies conducting sedimentation investigations on work in progress or planned, important findings, new methods, new publications, laboratory and other research activities, and other pertinent information.

Water Resources Council, Sedimentation Committee Annual Report, 1970.

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"The Measurement of Sand Transport by Means of Radioactive Tracers."

Proc. Royal Soc. of London, ser. A, Vol. 266, p. 402-421, 1962.

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"Der Geschiebetrieb als Wahrscheinlichkeits-problem."
("The Bed-load Movement as a Probability Problem.")

Mitteilung der Versuchsanstalt für Wasserbau, an der Eidgenössische Technische Hochschule in Zürich, Verlag Rascher and Co., 110 p., 1937.

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"Sand Transport Studies with Radioactive Tracers."
Am. Soc. Civil Engineers Proc., Vol. 90, No. HY3, p. 39-68,
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MANUAL, COMMITTEE ON SEDIMENTATION.
"Sediment Transportation Mechanics: Introduction and
Properties of Sediment."
Am. Soc. Civil Engineers Proc., Vol. 88, No. HY6, pt. 1,
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Protection."
RIVERS 76, Symposium on Inland Waterways for Navigation,
Flood Control and Water Diversions, 3rd Annual Symposium of
the Waterways, Harbors, and Coastal Engineering Division of
ASCE, Colorado State University, Fort Collins, Colorado,
August, 1976.
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"Sediment Transport Technology."
Text, Water Resources Publications, P.O. Box 303, Fort
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Transport."
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Proceedings, ASCE Journal of Hydraulics Division, Vol. 92,
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"The Dissimilarity Between Spatial and Velocity-Weighted
Concentrations."
USGS Professional Paper No. 475-D, CER63-HPG-DBS23. Also,
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Professional Paper 562-G, U.S. Geological Survey, Washington, D. C., 1965.
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